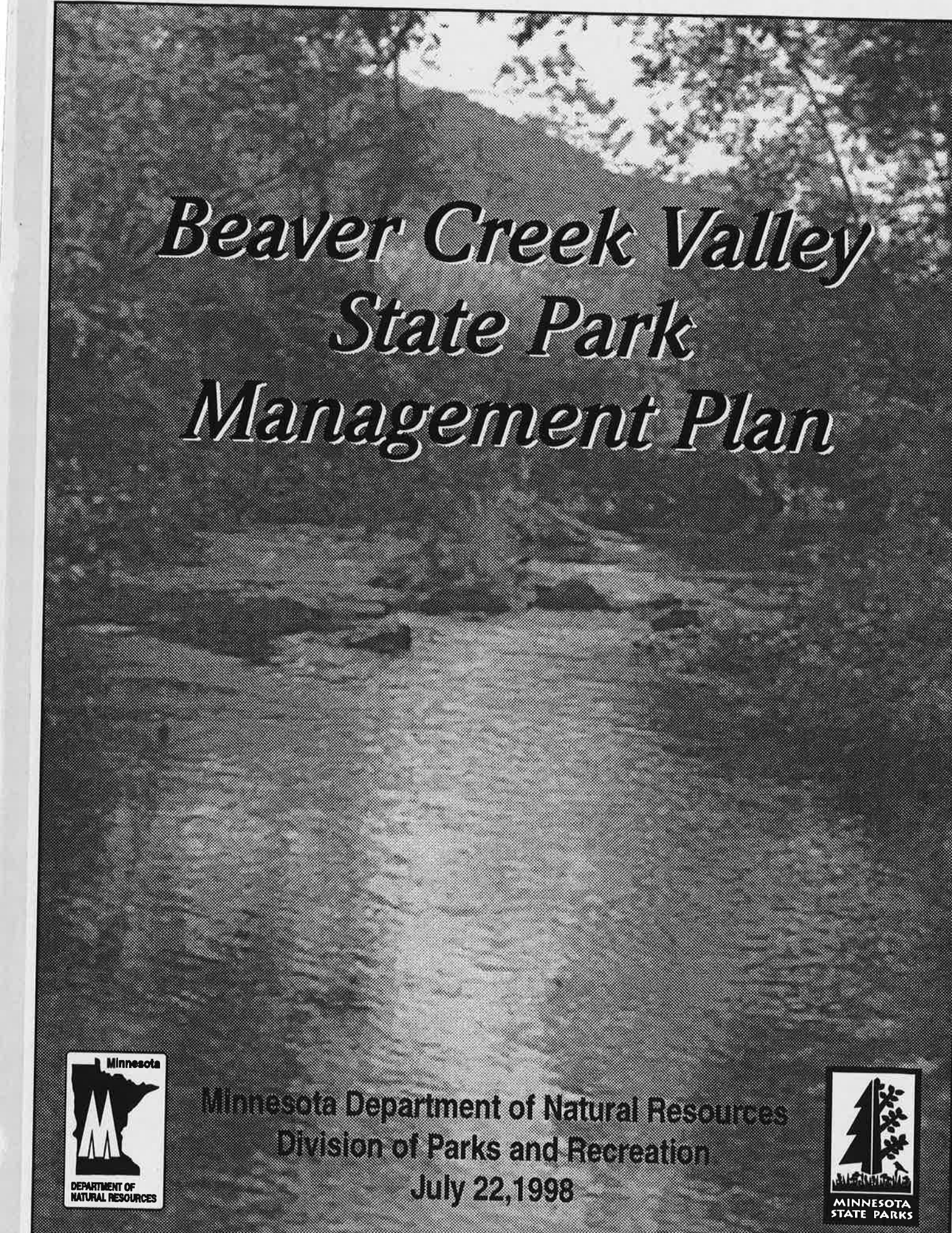




Beaver Creek Valley State Park Management Plan



Minnesota Department of Natural Resources
Division of Parks and Recreation
July 22, 1998





Minnesota Department of Natural Resources

OFFICE OF THE COMMISSIONER

500 Lafayette Road
St. Paul, Minnesota 55155-4037

RE: Department of Natural Resources Approval of Management Plan for Beaver Creek Valley State Park.

Minnesota Statutes 86A.09 requires that a master plan be prepared for units of Minnesota's outdoor recreation system. Laws of Minnesota for 1905 established Beaver Creek Valley State Park.

The recommendations in this plan are the result of a partnership based planning process. It was developed with the assistance of many citizens and technical experts from several agencies. The management plan was approved by the MnDNR Senior Managers Steering Committee review process during September, 1998.

A handwritten signature in cursive script, reading 'Rodney W. Sando'.

Rodney W. Sando, Commissioner
Minnesota Department of Natural Resources

9/21/98
Date



Acknowledgments

Thank you to the members of the Citizen's Advisory Committee for all the hours of their time they donated to help guide the development of this plan.

Beaver Creek Citizen's Advisory Committee

ANN THOMPSON

GEORGE CHANDLER
MINNESOTA TROUT ASSOCIATION

ROGER & GRETCHEN JOHNSON

GREG YAKLE

KEN FORDAHL

CAROL SCHUMACHER

DEBORAH ANDERSON
PRAIRIE SMOKE

JIM EDDY

CITIZENS FOR WHITEWATER STATE PARK

VIRGIL JOHNSON

LAVERNE & JULIA MASSMAN

MICHAEL JERESEK
STREAM IMPROVEMENT CHAIR
WIN-CRES CHAPTER OF TROUT UNLIMITED

TOM & ANN EMERY

KEN KAILING

Beaver Creek Valley EBM Team

DENIS ALLEN
REGIONAL PLANNER
REGION 5

CRAIG BLOMMER
AREA SUPERVISOR
DNR TRAILS & WATERWAYS

KATHY BOLIN
RESOURCE SPECIALIST
DNR PARKS & RECREATION

DAN BOOK
AREA ENFORCEMENT OFFICER
DNR ENFORCEMENT

BONNIE ERPELDING
NONGAME SPECIALIST
DNR WILDLIFE

LARRY GATES
WATERSHED SPECIALIST
DNR WATERS

JEFF GREEN
GROUND WATER SPECIALIST
DNR WATERS

NICK GULDEN
AREA MANAGER
DNR WILDLIFE

BILL HUBER
AREA HYDROLOGIST
DNR WATERS

STEVE KIRCH
REGIONAL MANAGER
DNR PARKS & RECREATION

JOHN LILLY
REGIONAL PARK OPERATIONS SPECIALIST
DNR PARKS & RECREATION

RANDY MELL
AREA FORESTER
DNR FORESTRY

ANN PIERCE
BLUFFLANDS COORDINATOR
DNR REGION 5

JIM WAGNER
AREA FISHERIES MANAGER
DNR FISHERIES

Thomas Polasik,
Park Planner
Division of Parks and
Recreation
500 Lafayette Road
St. Paul MN 55155-4039
(612) 297-5644

Bill Bellman,
Manager
Beaver Creek Valley State
Park Rt 2, Box 57
Caledonia MN 55921
(507) 724-2107

Steve Kirch,
Regional Manager
Division of Parks and
Recreation
2300 Silver Creek Road NE
Rochester MN 55906
(507) 280-5057

BEAVER CREEK VALLEY STATE PARK **MANAGEMENT PLAN**

Table of Contents

I.	INTRODUCTION	1
	Park Description	1
	Park History	1
	Unit Planning Process	6
II.	MISSION AND VISION STATEMENTS	7
	DNR Vision Statement	7
	Division of Parks and Recreation Mission/Vision	7
	Division of Parks and Recreation Mission	7
	Division of Parks And Recreation Vision	7
	Beaver Creek Valley State Park Mission/Vision	7
	Beaver Creek Valley State Park Mission	8
	Beaver Creek Valley State Park Vision	8
	Beaver Creek Valley State Park Management Activities	9
III.	REGIONAL ANALYSIS	14
	Regional Population Analysis	14
	Tourism and Marketing	14
	Supply and Demand of Recreation Facilities	16
	Supply	16
	Campgrounds	17
	Picnic Areas	17
	Boat Accesses	17
	Hiking and Cross-Country Ski Trails	17
	Bike Trails	17
	Snowmobile Trails	18
	Horse Trails	18
	State Scientific and Natural Area Land	19
	State Wildlife Management Area Land	19
	Scenic Byways	19
	Iowa and Wisconsin Recreation Facilities	20
	Demand	20
	Park Visitor Analysis	21
	Day Use	21
	Overnight Use	21
IV.	INVENTORY OF EXISTING RECREATIONAL FACILITIES, AND NATURAL AND CULTURAL RESOURCES	22
	Recreation Resources	22

Existing Development	22
Camping	22
Trails	22
Day Use	23
Park Administrative Facilities	24
Natural Resources	26
County Land Use	26
Blufflands Ecosystem	26
Climate	27
Microclimate	28
Geology and Minerals	28
Soils	29
Water Resources	32
Natural Communities	34
Endangered, Threatened, and Special Concern Species	37
Wildlife	38
Birds	38
Reptiles and Amphibians	38
Mammals	38
Fish	39
Cultural Resources	40
Archeology	40

V. ECOSYSTEM BASED MANAGEMENT, AND NATURAL AND CULTURAL RESOURCES MANAGEMENT	41
Ecosystem Based Management	41
Natural and Cultural Resources Management	41
Natural Resources Management Objectives	41
Cultural Resources Management Objectives	44
VI. RECREATION RESOURCES MANAGEMENT	45
Recreation Resources Management Objectives	45
Proposed Development	45
Day Use Facilities	45
Overnight Facilities	48
VII. INTERPRETIVE SERVICES	50
Introduction	50
Interpretive Clientele	51
Interpretive Themes & Programming	51
Summary of Existing Interpretive Services	53
Interpretive Services Recommendations	54
VIII. FACILITIES AND BUILDING MANAGEMENT	55
Administrative Facilities	55

Proposed Development	55
IX. PARK BOUNDARY	57
Boundary Modification	57
Existing Statutory Boundary	57
X. OPERATIONS, STAFFING, AND COSTS	59
Operations and Staffing	59
Costs	60
XI. PARTNERSHIPS WITH THE COMMUNITY	61
Partnership Objectives	61
Tourism	62
Volunteers	63
Partnerships	63
XII. PLAN MODIFICATION PROCESS	64
APPENDIX A - Bibliography	66
APPENDIX B - Soil Descriptions	68

© State of Minnesota, Department of Natural Resources, 1998

I. INTRODUCTION

PARK DESCRIPTION

Beaver Creek Valley State Park is located in the Blufflands Landscape Region of Southeastern Minnesota approximately 5 miles west of Caledonia in Houston County. Beaver Creek Valley State Park is known for its clear stream fed by a spring which originates in the park. Brown and native brook trout are found in the stream. Wildflowers blanket the woodland hills and valleys in the spring. The lowland hardwood provides habitat for numerous migratory songbirds like the rare Acadian flycatcher, Cerulean warbler, and Louisiana waterthrush which also nest in the park. Hiking trails meander along the stream and up into a maple-basswood and oak forests, and across small bluff prairie openings.

The great diversity of plant species contribute to a great diversity of wildlife. Deer, raccoon, muskrat, mink, badger, red and gray fox, beaver, and wild turkey are native to the park. An interesting reptile which resides in the park is the timber rattlesnake, which is seldom seen. Birdwatchers come from all the Midwest to the park to see the Acadian flycatcher and the Louisiana waterthrush and the many birds that live or migrate through. Although the park does not have a naturalist on staff, activities are offered occasionally.

Historically, the area attracted European settlers because of rich agricultural soils, hardwoods, and many streams which made milling possible. Preliminary archaeological surveys report that just north of the park was once a village site inhabited by American Indians. Bottomland hardwoods such as black ash, willow, box elder, cottonwood, walnut, and elm grow in the valley while a mix of maple, basswood, and oak thrive above the floodplain. Small patches of native prairie and oak savanna occupy some of the south and west facing slopes in the park. The park is situated in one of the most interesting geologic areas in Minnesota --the "driftless area" (see Park Elevation map, next page). The area covers 10,000 square miles in adjoining parts of Minnesota, Wisconsin, Iowa, and Illinois, which was relatively untouched by the most recent glacial advances. However, as the glaciers receded, torrents of meltwater poured into streams and rivers, carving deep rugged valleys. The rocky walls are made up of a layer of sandstone sandwiched between two layers of dolomite, which were deposited by inland seas between 450 and 250 million years ago.

Park History -The following text describing the park's history was written by former Beaver Creek Valley State Park manager Larry Buchholz for a local historical journal titled Caledonia Pride.

"In the 1890's when the community first became conscious of the tranquil beauty of this secluded valley, Farmer Oseth, who lived on the rim of the valley, daily trod a well worn trail with yoke and pails of milk and cream to the spring where an improvised wooded tank served as his private cooling system. The visitors who dared the rocky road to the spring utilized the same device to cool their butter, creams, melons and beverages. Hence the farmer with the yoke and city dweller with his 'surrey with the fringe on top' came to

BEAVER CREEK VALLEY STATE PARK

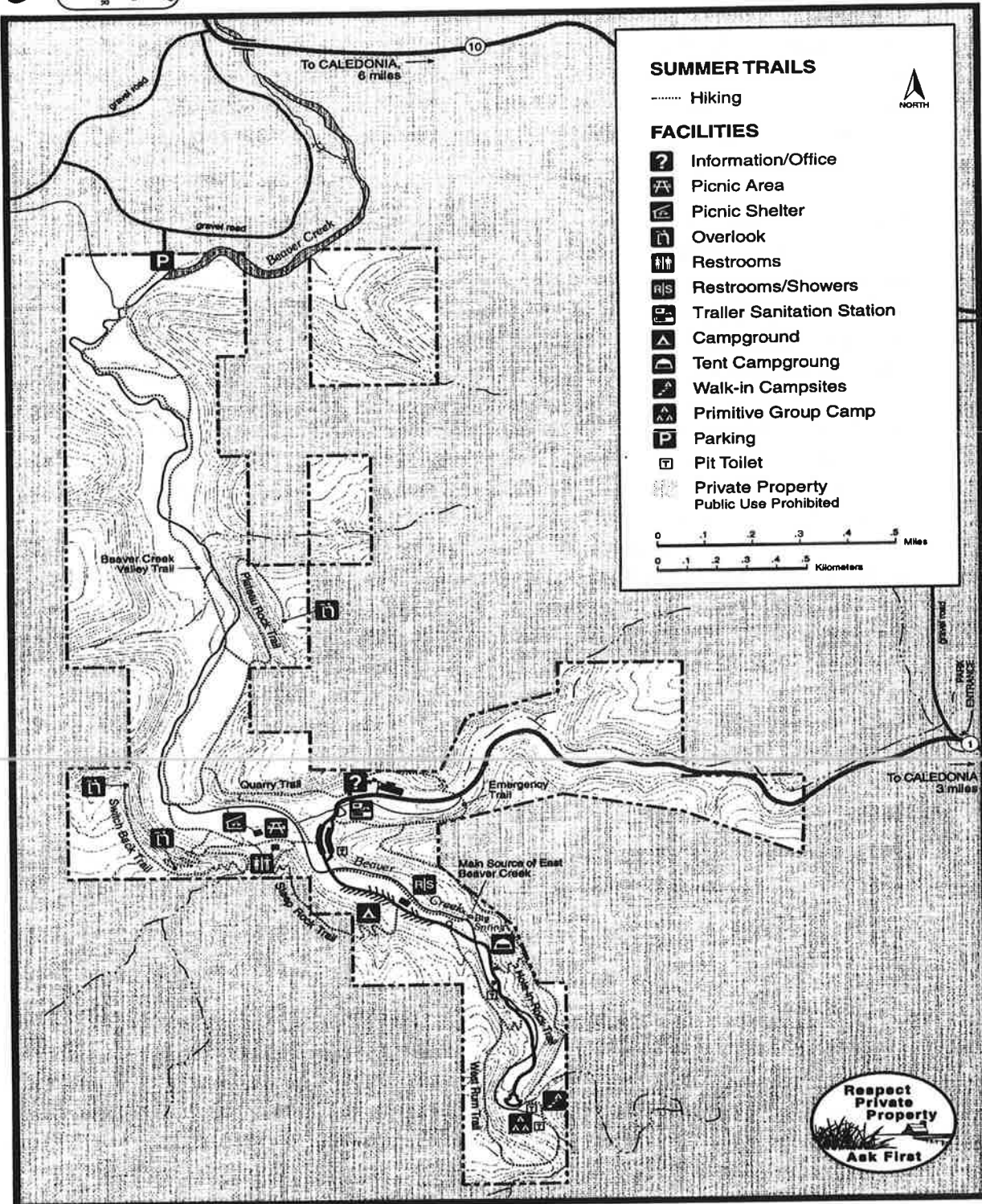
FACILITIES AND FEATURES

- 26 semi-modern campsites
- Dump station, showers, and vault toilets
- 16 rustic campsites
- 6 walk-in campsites
- Primitive group camp (100 capacity)
- Picnic grounds with 50 tables and an enclosed shelter
- 8 miles of hiking trail

LOOKING FOR MORE INFORMATION?
The DNR has mapped 16 of 17 sections of the park. Each section is available with their recreational facilities. Public Recreation Information Maps (PRIM) are available for purchase from the DNR gift shop. DNR regional offices, county state parks and major sporting and trip stores.

Check it out - you'll be glad you did.

© 4/1997 by State of Minnesota,
Department of Natural Resources



a mutual regard for each other's privileges and responsibilities at the Big Spring." (Lommen & Steffen, 1953)

The park was used as a recreation area near the Big Spring in the early part of this century. Also, in the early days of this half-century an enterprising Caledonia citizen build a large covered horse drawn wagon, called Black Maria by its patrons. The wagon was used for transportation and for dormitory facilities by the youths who frequently camped on 'the beach' at the spring. There were anxious hearts at home when summer storms came, fearing what the floods might do to the wagons and tents at night." (Lohmen & Steffen, 1953)



Early recreation use near Big Spring, circa 1902.

The Big Spring and the other geological features of the area are what attracts people to the valley. For these features is the beginning history of the park.

"This is a glimpse of the historic Minnesota, where the features have been a long time in the making of an area untouched by the glaciers. This is an area not only notable for its scenery but valuable for its geologic story. Preserved for us here is a relic of the general type of topography which was presumably encountered and ridden over the first glacier in the other parts of the state.

Within the driftless area we find a truly 'mature' topography. There has been plenty of time for the streams of the area to establish excellent drainage, time to slice away at the uplands until they are only relatively narrow divides, time for the major streams to develop wide flood plains and establish courses across them." (Harris, 1951)

The Big Spring area has long been used by the locals as a recreational area. Native Americans used the area and there is a village site on the north end of the park. Adjacent to the park on the north end is a two story grist mill with original stones built in 1875-76. Known as Schech's Mill, it is historically significant for three reasons: It is the only flour or grist mill in Minnesota known to contain complete, unaltered and operational equipment for new process milling; it is the only water powered mill in Minnesota known to contain original and operational millstones; and it is one of the only three historic mills in Minnesota still using water power.

"Although the area was privately owned, much of it divided into wood lots, it has been used for picnics long before the state took an interest in it. State Representative John R. Trisch of Caledonia has been credited with bringing Beaver Creek Valley to the attention of state officials about 1934. In June 1935, the Executive Council allocated \$45,000 to a project there as part of an \$8.5 million flood control project to provide work for the unemployed. Actual work did not begin for another three years but people began talking about the 'park' almost at once, even before any land had been acquired. The Houston

County Rod and Gun Club began holding its annual picnic there in 1933.



Beaver Creek State Park dedication ceremony, September 24, 1936.

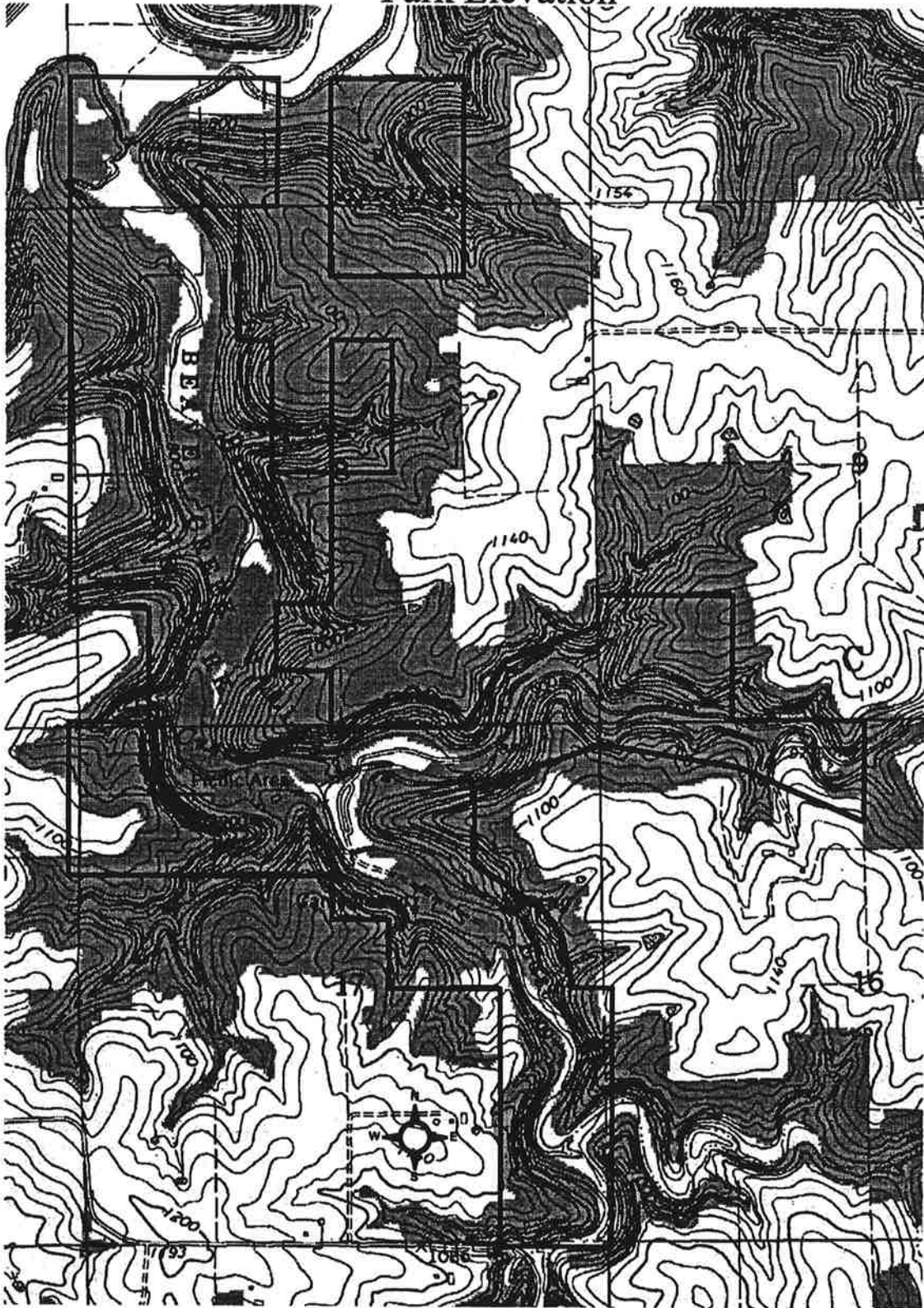
Land acquisition began in 1936 and continued over the next few years, until the park had an area of 324 acres costing \$8,784.15. At the time of the first purchases, state WPA administrator, Victor A. Christgau had not released the necessary funds to begin development, but in July 1938 work got under way. The local newspaper reported that the project, which would employ up to ten men, consisted of building a dam, two bridges, and a road to the track that was to be developed for recreation. Work must have proceeded very slowly, for by 1940 the only facility constructed by WPA workers was the entrance road. Picnic grounds followed and a few trails were laid out. Not until after World War II were campgrounds added.

In time, the park's small size became a matter of concern. Despite a minor expansion authorized by the legislature in 1955, by the late 1950's the parks people were becoming concerned that timber on the bluffs above the park might be cut and thereby damage the park by encouraging erosion. They thought that the park ought to be expanded to at least 1,000 acres, including a buffer to protect the valley itself. In 1963 legislature authorized an expansion of the boundary to 1,025 acres and further increases were provided for in 1967 and 1969. By 1980, only 617 acres out of the 1,214 within the statutory boundaries were state owned, and no additions have been since then." (Meyer 1991)



View of water crossing and swinging bridge over East Beaver Creek circa 1950s.

Beaver Creek Valley State Park Park Elevation



UNIT PLANNING PROCESS

This management plan was developed through an open public process. Two committees were used during the process to provide input into the development of the plan.

A Park Advisory Committee (PAC) was formed to provide public input into the plan throughout the planning process. The advisory committee was comprised of people that are primarily from the local area and have an interest in the future of the park. These individuals represent a variety of perspectives that are intended to be representative of the diversity of the public at large. The committee members unselfishly spent many hours over the course of the planning process to analyze and provide recommendations on a variety of environmental and recreational issues.

The other committee was an Ecosystem Based Management (EBM) team. It is comprised of technical experts from each division or unit of the DNR with resource management responsibilities. Both of these committees helped identify the major issues that needed to be addressed during the planning process.

The planning process started with a public informational meeting explaining how the plan would be developed. An invitation was extended to anyone who wanted to participate on the Park Advisory Committee (PAC). Throughout the planning process, PAC meetings were held to discuss specific issue areas and look at management alternatives. A final open house was held to review the plan and to solicit public opinion on the proposals. Copies of the draft were made available for review for thirty days.

The revised draft received official review by DNR staff and was signed by the Commissioner of Natural Resources.

A complete park plan and "planning process files" documenting the 1996-97 planning process and pertinent background information was distributed to the following locations: Beaver Creek Valley State Park Office (the Park Manager will maintain both a "hard copy" of the plan and an electronic copy of the plan on the Park's computer), State Park Regional Park Manager's Office in Rochester, State Park Planning Section in St. Paul, and the DNR Bureau of Engineering in St. Paul.

The recommendations in this plan are the result of this partnership-based planning process. This plan provides a basic management direction for Beaver Creek Valley State Park and is not intended to provide specific management or development details.

II. MISSION AND VISION STATEMENTS

DEPARTMENT OF NATURAL RESOURCES VISION STATEMENT

We will work with the people of Minnesota to manage the state's diverse natural resources for a sustainable quality of life.

DIVISION OF PARKS AND RECREATION MISSION/VISION

Division of Parks and Recreation Mission

We will work with the people of Minnesota to provide a state park system which preserves and manages Minnesota's natural, scenic and cultural resources for present and future generations while providing appropriate recreational and educational opportunities.

Division of Parks And Recreation Vision

We will continue to work with the people of Minnesota to ensure that the Minnesota State Park system will be sensitive to the needs of current and future generations and guided by the following principles and values:

- A commitment to ensure deliberate and effective natural, cultural, historical and archeological resource management;
- A commitment to provide appropriate recreational opportunities;
- A commitment to maintain a proper balance between resource protection and recreational use of state park lands;
- A conscious recognition of our responsibility to the public for wise and prudent acquisition and development of state park lands;
- A recognition of our environmental education and interpretive roles;
- A pledge to provide high quality public service;
- A promise to consistently seek public involvement and support in decision making;
- A conscious and continuous effort to respect the valuable human resources embodied in our employees and the public;
- A commitment to manage state parks for the benefits that they provide to people, society, the environment and the economy;
- A continued desire to actively seek and adopt innovative, effective and efficient management practices; and
- A realization of our responsibility to secure and maintain the resources necessary

to implement our mandates and mission.

BEAVER CREEK VALLEY STATE PARK MISSION/VISION

Beaver Creek Valley State Park Mission

To preserve and manage the diverse natural, scenic, and cultural resources of Beaver Creek Valley State Park for present and future generations while providing appropriate recreational and educational opportunities.

Beaver Creek Valley State Park Vision

- Beaver Creek Valley State Park will be a focal point on a trail and wildlife corridor that follows the East Beaver Creek. Hiking trails will provide access for park users to enjoy the rich natural resources of the park and the East Beaver Creek Valley.
- The native riparian forests, and bluffland vegetation communities in the park will be restored and managed for Minnesota citizens to enjoy, and study. Much of the park will remain undisturbed except for management of the natural resources, and limited trail access.
- The park will provide ample room for restoration, preservation, and enjoyment of the parks natural resources. The park will provide enough space for existing recreation activities, and disperse visitors. Additional low impact, handicapped accessible recreation facilities will be developed for the enjoyment of park visitors.
- Park visitors will have the opportunity to visit and learn about the natural, historic and cultural resources in the park and surrounding area.
- Interpretation of the natural, cultural, and historic resources of Beaver Creek Valley and the Blufflands will be an important activity in the park.
- East Beaver Creek will be clean, and the water flow will be stabilized.
- Habitats will be healthy and support stable populations of rare species.



View of East Beaver Creek Valley



View of East Beaver Creek

BEAVER CREEK VALLEY STATE PARK SUMMARY OF MANAGEMENT ACTIONS

Natural Community Management

Action: Monitor and document populations of rare species.

Action: Maintain or increase populations of rare species.

Action: Monitor and document populations of problem species.

Action: Remove or control problem species.

Action: Use plant materials that are native to Beaver Creek Valley. The genetic material should come from a certified local source.

Action: Work with adjacent landowners, if interested, to do collaborative, and complimentary resource management where appropriate, and feasible. Cooperative activities may include assistance in preparing Land Stewardship Plans, providing resources management information, or actually providing management assistance.

Action: Provide resources management interpretation where appropriate, and needed.

Action: Employ natural phenomena such as fire to manage the parks resources whenever possible.

Maple Basswood Forest

Action: Limit recreation development, and activity in this community.

Action: Evaluate to determine if Maple-Basswood stands qualify for old-growth or future old-growth. If stands do qualify, they should be managed under old-growth guidelines.

Lowland Hardwoods

Action: Eliminate alien species. Black locust should be cut and treated to prevent resprouting. Exotic flowers should be removed from the park entirely (i.e., day lilies (*Hemerocallis fulva*), cultivars of lilies (*Lilium spp.*), Dame's rocket (*Hesperis matronalis*). The water cress (*Nasturtium officinale*) is an introduction but it will probably be unfeasible to eliminate.

East Beaver Creek

Action: Conduct annual inspections of the improvement zone to document recovery of the area and to monitor the condition of improvement structures, particularly after severe floods.

Action: Monitor plant, and animal populations within habitat improvement areas.

Action: Insure that any future trout habitat improvement projects are consistent with the Department of Natural Resources objective of protecting endangered, threatened, and special concern species.

Action: Any future habitat improvement projects or fisheries management activities will follow the coordination guidelines in the Memorandum of Understanding (MOU) titled GENERAL COORDINATION GUIDELINES between the DIVISION OF PARKS AND RECREATION and the SECTION OF FISHERIES on ACTIVITIES RELATED TO OR AFFECTING FISHERIES RESOURCES IN STATE PARKS.

Black Ash Swamp

Action: Discourage public use because of their sensitivity of the black ash swamp community's sensitivity to disturbance.

Dry Prairie

Action: Prepare a fire management plan and implement a prescribed burn program for the dry prairie community.

Oak Forest

Action: Evaluate to determine if oak forest stands qualify for old-growth or future old-growth. If stands do qualify, they should be managed under old-growth guidelines.

Action: Prepare a fire management plan and implement a prescribed burn program for the oak forest community.

Algific Talus Slopes

Action: Discourage public use on the algific talus slopes because of their sensitivity to disturbance.

Old Field

Action: Manage as open grassland in floodplain using fire, and selective herbicides to retard brush encroachment.

Cultural Resources Survey

Action: Survey for cultural resources in park use areas and on future additions to the park.

Action: Continue to survey for cultural resources in areas where facilities are being developed in the park, and in resource management project areas.

Culture Site Mapping

Action: Register the location and pertinent relational data for each cultural resource property on the Department of Natural Resources, Geographic Information System.

DAY USE FACILITIES

Trails

Caledonia to Houston Bike Trail

Action: Options for a trail with a spur trail connection from BCVSP to the proposed Caledonia-Houston Trail are encouraged. All options will be carefully assessed when they are proposed.

Picnic Area

Action: Add one or two picnic shelters near the picnic area parking lot. They should be small open shelters, that protect about six to eight picnic tables from the sun and rain.

Action: Update existing picnic shelter by improving the lighting, and adding new doors that can be easily opened or closed as needed.

Picnic Area Sanitation Building

Action: Remove the building and replace it with two single vault toilets.

Picnic Area Road and Parking Lot

Action: Add several inches of gravel to the road, and parking lot in the picnic area.

Big Spring Overlook

Action: Provide steps down to the spring and an ADA accessible viewing area overlooking the Big Spring.

Playground /Wading Pool Area

Action: Remove surplus sand from the area around the playground and pool, and replace with topsoil, and seed with grass.

Action: Plant vegetative screening around area to make it more aesthetically pleasing.

Trails

Action: Rehabilitate sections of the 8 mile trails network by repairing bridges, adding steps, water bars, and erosion control structures.

Action: Plan, develop, and implement a self-guided nature trail.

North-end Parking Lot

Action: Install signing stating park rules, emergency procedures, and prohibited uses.

Action: Re-grade the parking lot surface for better drainage, add gravel and add cement parking curbs.

OVERNIGHT FACILITIES

Campground Roads and Campsite Parking Spurs

Action: Replace the low-water/cement slab crossing at the campground entrance.

Action: Install culverts, steel grates in low dips in campground road.

Action: Re-grade, and add additional gravel to the campground road. Paving is not recommended due to the resulting increased vehicular speeds, and the possibility of chemical runoff into the trout stream.

Action: Add gravel and level campsite parking spurs.

Campground Water System

Action: Replace and extend the entire campground water system.

Tent Only Campsites

Action: Improve the parking spurs in the tent-only campground.

Campground Visitor Parking Objectives

Action: Construct a small visitor parking lot in the Big Spring Campground.

South Campground Parking Lot

Action: Install a properly designed parking lot at the end of the campground road loop for campers using the three primitive group camping areas, the six walk-in campsites, and tent-only campsites T-15 and T-16.

Camper Cabins

Action: Construct one and possible two camper cabins.

Primitive Group Camp

Action: Construct a small shelter building in the primitive group camp.

Action: Install 2 new vault toilets in the primitive group camp.

INTERPRETIVE SERVICES RECOMMENDATIONS

Action: Provide funding for and hire combined position to do interpretation and resource management in the "Blufflands" State Parks.

Action: Provide funding for and develop a self-guided interpretive trail.

Action: Upgrade the existing exhibits in the "nature center" by labeling, interpreting and providing a connecting theme.

Action: Develop and print new brochures for BCVSP including a bird list, a wildflower list, and an anglers brochure with tips on fishing for trout in East Beaver Creek.

Action: Develop an interpretive publication about the park's resource management activities.

Action: Develop an interpretive publication on the geology of the park (drift less area, glacial meltwater, springs, etc).

Action: Develop interpretive signage at unique park features such as the "Big Spring".

ADMINISTRATIVE FACILITIES

ADA Requirements

Action: All new and rehabilitated facilities will be brought up to ADA standards.

Shop Building Addition

Action: Add a large unheated storage addition to the existing shop building.

Service Area Loop Spur

Action: Provide a second entrance to the shop/service area by constructing a small road loop to the park entrance road on the east end of the service area.

Park Office

Action: Determine the feasibility of eliminating this building, and replacing it with a more appropriate, functional building.

Action: Re-evaluate the floor plan arrangement to see how it could be improved to better utilize the space that is available to better serve the public and the administrative work of the park.

Action: Remodel the park office interior to make it more functional.

Visitor Information

Action: Install information signs or kiosks in the campground, primitive group camp, picnic area, and north-end parking lot.

Action: Professional quality interpretive displays with a connecting park theme.

Park Office

Action: Remodel the interior office space so it functions better as an office and as a visitor contact station.

Action: Landscaping the grounds around the office and service area with low maintenance native plants.

BOUNDARY MODIFICATION

Action: No boundary modifications are proposed as a result of this planning process. Boundary modifications will be made on a case by case basis.

EXISTING STATUTORY BOUNDARY

Action: Park maps will no longer include private lands. Only state owned lands will be illustrated on maps for public distribution.

Survey and Post Park Boundaries

Action: Complete survey for the remainder of state-owned lands.

Action: Install state park boundary signs in all areas where they are missing.

OPERATIONS AND STAFFING

PARTNERSHIP WITH THE COMMUNITY

Tourism

Action: The park staff will recommend private facilities such as mill tours, cave tours, and privately owned campgrounds, especially when the park campground is full. Park staff will cooperate with and complement private facilities in the area.

Action: Plan for increased use because Beaver Creek Valley State Park has experienced very significant growth in visitation and revenue collected since the mid 1990's.

Action: Seek opportunities to promote educational use of plan resources by teachers and school children. Beaver Creek Valley State Park is an exceptional outdoor classroom for nature study.

Action: Cooperate with area Chambers of Commerce and other tourism groups to promote the entire area of southeastern bluff country.

Volunteers

Action: Develop a volunteer plan and process for maximum utilization of volunteers in the park.

Action: A list of volunteer projects will be made available so that volunteers can select projects that are appropriate for their skills, knowledge, and abilities.

Action: The park will attempt to utilize volunteers and partnerships as much as possible.

Partnerships

Action: Work with landowners within the park boundary and in adjacent areas so that land is managed to protect water quality, woodlands, and other natural resources.

Action: Park staff should participate in local and regional planning efforts to sustain healthy ecosystems. Planning should begin at the landscape level to determine where opportunities exist in the landscape to promote natural community efforts.

Action: Park staff should work with groups active in water related issues such as watershed planning, etc.

III. REGIONAL ANALYSIS

REGIONAL POPULATION ANALYSIS

Beaver Creek Valley State Park is situated in Midwestern Houston county; the county population totaled 18,497 in 1990. The three largest cities in Houston county are La Crescent (4,311), Caledonia (2,846), and Spring Grove (1,153). Populations in counties and major cities surrounding the park are listed below and can be located on the Regional Context map (page 18).

Table 1. Populations of major counties and cities in southeastern Minnesota.

<u>Counties</u>	<u>1990 Population</u>	<u>Major Cities</u>	<u>1990 Population</u>
Fillmore	20,777	Caledonia	2,846
Houston	18,497	La Crescent	4,311
Mower	37,385	Plainview	2,768
Olmsted	106,470	Rochester	70,745
Wabasha	19,744	Stewartville	4,520
Winona	47,828	Winona	25,399
Total	250,701	Total	110,589

Beaver Creek Valley State Park is located in the southeast corner of Minnesota. The park is located 12 miles from the Iowa border and 19 miles from the Wisconsin border. Within a 50 mile radius of the park lies the cities of Decorah, Iowa and La Crosse, Wisconsin. The 1990 population of Decorah totaled 8,063 and La Crosse totaled 51,003. Large cities of Wisconsin that also lie within the 50 mile radius are Onalaska, (11,284), Sparta, (7,788), and Tomah, (7,570). The entire southeastern portion of Minnesota, western Wisconsin, and northeastern Iowa has increasingly felt the effect of rapid urbanization putting increased demand on local recreation resources.

TOURISM AND MARKETING

The travel and tourism industry is one of the top five employers for the state of Minnesota. Travel and tourism accounted for 136,123 jobs statewide in 1994. In 1994, the southeast region's employment impacts of domestic travel was 13,145 of those jobs, or 9.7% of the state wide total. The gross receipts impacts for 1994 in the southeast region was \$684,000,000 or 9.6% of the statewide total. The southeast region of the state ranks forth overall in total tourism receipts in 1994.

Tourism in southeastern Minnesota has increased significantly over the past decade.

Visitors are discovering the natural beauty of the Blufflands, which offers unique scenery and a very different experience from the rest of Minnesota. The unique Bluffland scenery is complemented by a variety of tourist attractions including many bed and breakfasts, resorts and campgrounds, Amish Community tours, bluff country eco-tours (provided by the Eagle Bluff Environmental Learning Center in Lanesboro), winery/apple/berry farms, Niagara Cave near Harmony, Minnesota, and Mystery Cave (located in Forestville State Park) near Preston, Minnesota.



Blood root, a common wildflower in Beaver Creek Valley State Park.

Birding is Big Business

The impact of birding on the economy of Southeastern Minnesota has been growing rapidly in the past few years. Communities throughout the region are beginning to promote the birding opportunities the area has to offer with the hope of attracting tourism money into the local economy. For example the Winona Convention and Tourism Bureau has published a brochure, "Interesting Birds in the Winona Area." For the past several years it has held events for swan and eagle watching, and it has advertised to attract visitors to these events. The events attract birders from throughout the Midwest who would not have normally stopped in the Winona area. In a follow-up study participants in the events not only reported the thousands of dollars they spent in the area while attending the events, but also reported they plan on returning to the area again. Beaver Creek Valley has become a very important destination for bird watching enthusiasts from throughout the country. Many of the parks visitors report they have come to Beaver Creek because of the birding opportunities the park has to offer.

Biking

One of the major new developments attracting visitors to southeastern Minnesota, and Beaver Creek is the Root River State Trail, extending from Rushford and eventually branching off to Preston and Fountain. The multi-use trail along the Root River resides on an abandoned railroad grade. The Root River State Trail provides outstanding scenery which includes the Root River Valley, rolling hills, and soaring limestone bluffs. Bicycling and hiking are the main summer uses, accounting for 91 percent of summer use (1990 DNR Summer Trail Survey), and cross country skiing is the main winter use. The planned "Blufflands Trail System" will connect most major communities in southeastern Minnesota and bridge the trail systems between Wisconsin, Iowa, and Minnesota.

Table 2. Sample tourism-related statistics for 1994 and the estimates for 1995 (other counties with state parks are included for comparison).

1. Total tourism receipts (including direct, indirect, and induced spending):

<u>County</u>	<u>1994 total</u>	<u>1995 estimated total</u>
Fillmore	\$11 million	\$11 million
Houston	\$5 million	\$6 million
Mower	\$10 million	\$10 million
Olmsted	\$466 million	\$518 million
Wabasha	\$4 million	\$5 million
Winona	\$33 million	\$29 million
Statewide total	\$7.096 billion	\$7.636 million

2. Number of jobs in the travel and tourism industry:

<u>County</u>	<u>1994 jobs</u>	<u>1995 estimated jobs</u>
Fillmore	209	213
Houston	105	108
Mower	185	191
Olmsted	8,952	9,710
Wabasha	82	91
Winona	638	542
Statewide total	136,123	144,183

3. Wages earned in tourism and travel:

<u>County</u>	<u>1994 total</u>	<u>1995 estimated total</u>
Fillmore	\$4 million	\$4 million
Houston	\$2 million	\$2 million
Mower	\$4 million	\$4 million
Olmsted	\$182 million	\$212 million
Wabasha	\$2 million	\$2 million
Winona	\$13 million	\$11 million
Statewide total	\$2.084 billion	\$3.086 billion

SUPPLY AND DEMAND OF RECREATION FACILITIES

SUPPLY

As a part of the Statewide Comprehensive Outdoor Recreation Planning (SCORP) process, the DNR has maintained a data base of recreational facilities since the early 1970's. While the data for most of the public facilities has been updated in recent years, some of the private facility data is out of date. Private facility information in this plan is supplemented by information from the Office of Tourism and local publications (1994).

Table 3 shows an estimate of selected recreational facilities within a 50-mile radius of Beaver Creek Valley State Park (Minnesota only). Fifty miles was chosen for its convenience within one hour's drive of the park. The lack of many water-related recreation facilities is due to the fact that the park is located in an area of Minnesota with very few lakes. The lack of lakes and water recreation increases the need for land recreation, resulting in an abundance of hiking, horse, ski and snowmobile trails.

Campgrounds

There is approximately 34 campgrounds within a 50 mile radius of the park. Eighteen of these campgrounds are publicly owned while the other 16 are privately run. Canoe campsites provided by the Trails and Waterways Unit of the Minnesota DNR add an additional 5 sites to the total number of campgrounds.

Table 3. Selected recreational facilities within a 50-mile radius of Beaver Creek Valley State Park (Minnesota only).

<u>Park</u>	<u>Drive-in Campsites</u>	<u>Horse Campsites</u>	<u>Group Campsites</u>
Beaver Creek Valley	42	-	1
Carley	20	-	4
Forestville	73	60	1
Lake Louise	22	6	1
Great River Bluffs (Formerly O.L. Kipp)	31	-	-
Whitewater	106	-	1

Picnic Areas/Beaches

Within a 50 mile radius of the park there are approximately 41 public picnic areas and only 3 beaches. The lack of public beaches is primarily due to the fact there are no natural lakes in southeastern Minnesota.

Boat Accesses

Approximately 33 boat accesses lie within 50 miles of the park. The boat accesses are owned and operated by many different operating agencies, including the Trails and Waterways Unit of the Minnesota DNR. The total number of boat accesses includes both carry-in and vehicle accessible launches.

Hiking and Cross-Country Ski Trails

Over 120 miles of ski trails and over 190 miles of hiking trails are located within 50 miles of the park.

Bike Trails

Within 50 miles of the park there are approximately 54

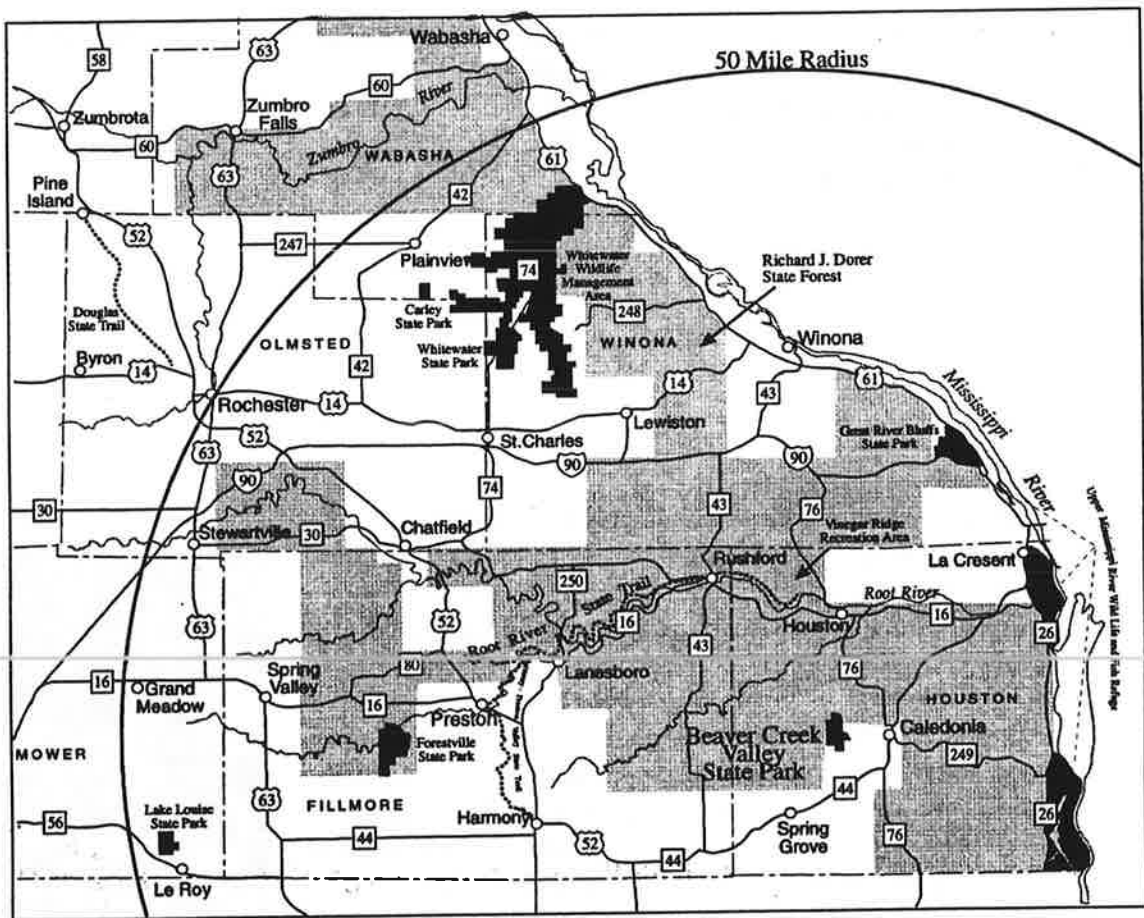


Biking on Root River State Trail

miles of bike trails. The majority of the total trail miles is provided by the Root River State Trail (36 miles), and the Harmony-Preston Valley Trail (18 miles). Three management units within the Richard J. Dorer State Forest offer mountain biking opportunities. The management units are: Brightsdale, Isinours, and Gribben Valley, all are located near the town of Lanesboro.

Snowmobile Trails

There are over 1,300 miles of Grant-In-Aid (GIA) snowmobile trails within a 50 mile radius of the park. GIA trails are funded by snowmobile registrations and unrefunded gas taxes through the Minnesota DNR to local units of government who in turn distribute the funds to local snowmobile clubs for trail development and maintenance. Most of the snowmobile trails are operated by the individual counties the trails are located in. Approximately 66 recreation facilities are owned and operated by the Minnesota DNR, Divisions of Forestry, Trails and Waterways, and Parks and Recreation.



Recreation Facilities within a 50 mile radius of Beaver Creek Valley State Park

Horse Trails

Although Beaver Creek Valley State Park does not offer horse trails, there are approximately 90 miles of horse trails within 50 miles of the park. The majority of the trail miles are publicly owned. Of the 5 state parks within 50 miles of the park, only

Forestville and Lake Louise State Parks offer horse trail. Forestville State Park has 14 miles of designated horse trails and Lake Louise has 9.7. Private campgrounds and resorts in the area also account for some of the total number of horse trail mileage.

State Scientific & Natural Area Land (SNA)

There are approximately six SNA areas within a 50 mile radius of the park. SNA designated areas protect rare and endangered species, and habitat, unique plant communities, and significant geologic features that possess exceptional scientific or educational values. These areas are open for nature observation, educational, and research purposes but are closed to most other recreational activities.

State Wildlife Management Area Land (WMA)

Approximately 14 WMAs lie within a 50 mile radius of Beaver Creek Valley State Park. WMA designated areas are managed to provide wildlife habitat, improve wildlife production, and provide public hunting and trapping opportunities. WMAs provide great opportunities for bird watching, photography and hiking. These areas are closed to all-terrain vehicles and horses due to potential detrimental effects on wildlife habitat.

Table 4 . SNAs, and WMAs within a 50 mile radius of Beaver Creek Valley State Park.

SNAs	WMAs
King's and Queen's Bluff*	Beaver Creek
Mound Prairie	McCarthy Lake
Rushford Sand Barrens	Whitewater
Kellogg-Weaver Dunes	Thorpe
Racine Prairie	Cartney
Wykoff Balsam Fir	Eastside
	Gordon W. Yeager
	Leroy
	Goethite
	Chosen Valley
	Dr. Johan C. Hvoslef
	Spring Valley
	William Pease
	Upper Iowa River

* Queens Bluff is located in Great River Bluffs State Park, it is an education unit, and requires a permit to enter.

Scenic Byways

Four scenic byways exist within 50 miles of Beaver Creek Valley State Park: The Great River Road, The Apple Blossom Scenic Drive, The Historic Bluff Country Scenic Byway, and The Shooting Star Scenic Byway. The state of Minnesota created the Scenic Byway Program in order to highlight the most scenic roads and enhance travelers appreciation for these resources. The scenic byways often include the most exceptional scenery, presence of excellent natural, cultural, historical, archaeological, and recreational resources. The Great River Road Scenic Byway runs from Lake Itasca to the Iowa border along most of the Mississippi River. Apple Blossom Scenic Drive is located in the

LaCrescent area of southeastern Minnesota. The Historic Bluff Country Scenic Byway runs adjacent to the Root River along Highway 16 from Dexter to LaCrescent. Shooting Star Scenic Byway travels along Highway 56 from Highway 63 passing Lake Louise State Park on the way to Interstate 90.

Iowa and Wisconsin Recreation Facilities - There are two State Preserves and one State Forest in Iowa that lie within 50 miles of Beaver Creek Valley State Park. Wisconsin has four State Parks and one State Forest that lie within 50 miles of the park.

Table 5. Iowa and Wisconsin State Parks and Forests within 50 miles of Beaver Creek Valley State Park.

<u>Iowa</u>	<u>Wisconsin</u>
Ft. Alkinson State Preserve	Black River State Forest
Hayden Prairie State Preserve	Merrick State Park
Yellow River State Forest	Perrot State Park
	Wildcat State Park
	Wyalusing State Park

The State Parks and State Forests of Wisconsin and Iowa have similar facilities and types of trails as those in Minnesota. The State Preserves provide recreation opportunities such as: hiking, photography, hunting, fishing, and trapping. State Preserves are used for the permanent protection of significant natural and cultural features.

DEMAND

There is a growing demand for the types of services provided at Beaver Creek Valley State Park. State Parks provide many unique natural resources and diverse recreational opportunities. These opportunities differ from most city, county, and private recreational facilities due to the significant resources and the atmosphere associated with them.

Table 6. 1996 State Park Attendance in Southeast Minnesota

<u>Park</u>	<u>Day Users</u>	<u>Overnight Users</u>	<u>Total Visitors</u>	<u>% of Visitors that are campers</u>
Beaver Creek Valley	28411	7434	35845	21%
Carley	27426	2295	29721	8%
Forestville Mystery Cave	113984	24468	138452	18%
Lake Louise	22587	3044	25631	12%
Great River Bluffs (Formerly O.L. Kipp)	23267	4867	28134	17%
Whitewater	382115	41223	423338	10%

The tourism in southeast Minnesota has dramatically increased in recent years. Beaver Valley State park is one of six parks in the southeast experiencing the effects of the tourism boom. Even though the State Parks in the area differ in services, recreational opportunities, and experiences, they can be used as a means to measure the total demand for State Park services in the area.

PARK VISITOR ANALYSIS

Beaver Creek Valley State Park hosts visitors from many states and even a few from other countries. According to the park manager the majority of users come from Minnesota, typically the Twin Cities Metropolitan Area.

Day Use

Day use accounts for approximately 79% of the total park visitors. The park has many recreational opportunities available to users. The number of visitors varies seasonally.

Beaver Creek Valley State Park is a popular destination during summer holidays for many families. Typical day use in the summer consists of hiking, biking, trout fishing, and picnicking. The park offers some cross-country skiing and



Girl Scout group hiking in park.

snowmobiling during the winter season. The concentration of users is slightly smaller during the spring and fall seasons. General use during the two seasons is trout fishing, hunting, viewing wild flowers, bird watching, and fall color observation. The park offers trout fishing and many hunters stay at the park during the wild turkey season. Although hunting is not allowed in the park, the surrounding areas are popular hunting destinations. According to the park manager the typical size of the day user party is three people.

Overnight Use

Overnight users at Beaver Creek Valley State Park are required to fill out a registration card. The cards provide the park managers with information such as the state the user is from, the average length of stay, and the average party size. The following paragraph provides an overview of this information according to the park manager, after a review of the 1996 camper registration cards.



Typical camping party at Beaver Creek Valley.

In 1996, users came from many states and a few were from other countries. The typical user is from one of the following states: Illinois, Indiana, Iowa, Minnesota, or Wisconsin. The majority of users come from Minnesota, typically the Twin Cities Metropolitan Area. The park is also a major recreation area for people that live in the surrounding towns. The average party size of overnight users is four people. On average these users stay for two nights, Friday and Saturday. Fall is a popular time for families to spend extended periods of time at the park. The overall length of stay increases slightly during the fall.

IV. INVENTORY

RECREATION RESOURCES

EXISTING DEVELOPMENT

CAMPING

The Big Spring Campground

There are 26 campsites in the Big Spring campground, and it can accommodate recreational vehicles up to 35 feet in length. Each site is equipped with a gravel parking spur, fire ring, and picnic table. Sixteen of the Big Spring Campsites are electrical sites equipped with 30 amp electrical outlets, one of which is handicapped accessible. Sanitation facilities consist of a semi-modern sanitation building equipped with showers and vault toilets. This building was recently rehabilitated to comply with the latest Americans with Disabilities Act (ADA) requirements, and all facilities are non handicapped accessible.

Primitive Tent-Only Campground This campground has 22 tent-only campsites. Each site is equipped with a fire-ring and picnic table. Six of the wilderness tent-only campsites are designated as walk-in sites which requires campers to park their vehicles and then walk a distance of 100 to 200 yards to their campsite. Sanitation facilities consist of two vault toilets.



Young camper cooking over campfire.

Group Campground

Beaver Creek Valley has one primitive group camp with three individual group camp sites. The group camp includes a shared parking area and one vault toilet. The nearest water supply is located along the gravel road leading to the shared parking area. Each individual group campsite consists of a mowed tenting area, picnic tables, and fire-rings.

TRAILS

Hiking

There are 8 miles of hiking trails in the park. With the exception of the Beaver Creek Valley Trail, all hiking trails require rather hard, steep climbs to the bluff tops where views are breath taking and panoramic at the summits. These trails traverse through forested areas of the park as well as through two small goat prairies. The exception to all of this is the Beaver Creek Valley Trail which begins at the Big Spring in the campgrounds and follows the valley floor and east Beaver Creek for approximately two miles to the north end visitor parking lot. This is a wide, mowed, grassy trail which crosses East Beaver Creek at four locations with small wooden foot bridges.

Cross Country Skiing

The park has no designated cross country ski trails. Although not marked, designated, or groomed as cross country ski trails, a small number of local and area residents do cross country ski on the Beaver Creek Valley Trail as well as the unplowed campground road during the winter months.

DAY USE

One Enclosed Picnic Shelter

The shelter located on the west side of East Beaver Creek was probably built during the late 1930's or early 1940's. It is a large building equipped with electric lights, electrical outlets, and a fireplace with a stone chimney. Heaviest use occurs during the summer months when it is reserved for large gatherings such as family reunions and weddings.

Nature Center

(See interpretive services section)

Fishing in East Beaver Creek

Fishing occurs in East Beaver Creek from its source at the Big Spring in the campground all the way to the north end of the park where it is joined by West Beaver Creek and then becomes Beaver Creek. Stocking of trout was discontinued years ago, and healthy populations of naturally reproducing brown trout are found throughout East Beaver Creek. Limited populations of native brook trout are found in the upper reaches of East Beaver Creek in the campground and picnic area. A trout stream habitat improvement project was completed in 1996 (previous work was done in the 50's and 70's) to increase the development of brown trout 16" and greater. These natural trout (not stocked) are a great challenge to the avid trout angler.



Trout angler.

Volleyball

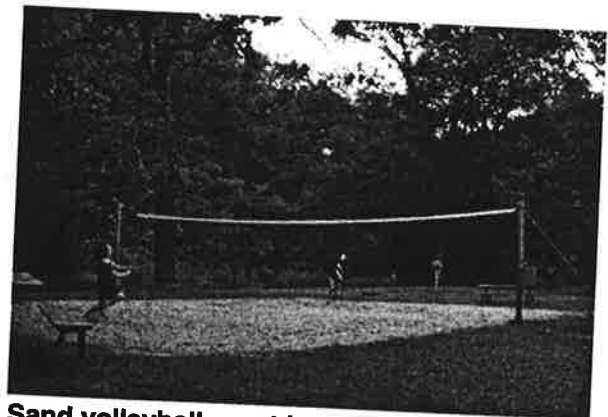
A sand volleyball court exists in the picnic area adjacent to the parking lot.

Children's Playground Area

A sand-based children's play area with playground equipment is located in the picnic area near East Beaver Creek.

Children's Wading Pond

A shallow, sand-based children's wading pond is located in the picnic area near East Beaver Creek. Water from East Beaver Creek is pumped into the wading pond and distributed through a sprinkler system. It is



Sand volleyball court in picnic area.

self draining in the picnic area and must be turned on and off manually each day it is in operation.

Interpretive Exhibits (See Interpretive Services Section)

Information Kiosks

Information for park visitors is displayed outdoors at several locations in the park. They are located at the entrance area by the park office, a small kiosk adjacent to the sidewalk in the picnic area, the campground sanitation building, and the picnic shelter building. Material displayed includes park rules, emergency procedures, and information of interest to park visitors.



Children's wading pool with playground area in background.

Sanitation Building with Vault Toilets

A sanitation building with vault toilets is located on the west side of East Beaver Creek near the picnic shelter in the picnic area. Water is not available in this building. Its location is a considerable distance from the picnic grounds parking lot. An asphalt sidewalk connects the picnic grounds parking lot with this facility.

Vault Toilets

A single uni-sex vault toilet is located just off the picnic grounds parking lot near the children's play area and wading pond.



Campground sanitation building.

PARK ADMINISTRATIVE FACILITIES

Park Office/Contact Station

The building currently being used as a park office/contact station is the former manager's residence and is now located in the service area along the park entrance road (Houston County Road 1). It contains a small office area with counter serving park visitors, a souvenir display area, a nature counter, lots of storage space, and a lunchroom in the basement for use by park staff. It also has a handicapped accessible ramp leading to the upper level entrance, and a large wooden deck located on the rear side of the building. It also has an attached double garage which is currently being used by the Division of Forestry for storage. Because it is a converted residence, the current floor plan does not allow for separate offices for park staff, and offers very limited space for park visitors waiting to be served.

Maintenance Shop

This is a wood framed building with two maintenance/storage bays, one of which is heated. It contains running water, but no toilet facilities. It is also used by the Division

of Forestry staff, Minnesota Conservation Corps (MCC) crews, and Sentence to Serve (STS) crews. The current space is not sufficient to warehouse existing park supplies and equipment.

Firewood Storage Shed

This is an enclosed wooden building used to store and keep dry firewood bundles for resale. It was constructed during the spring of 1996 and replaced an inadequate area for firewood storage.



Equipment maintenance being done in shop.

Gas & Oil Storage Shed

This is a small wooden building used to store oil, gasoline, diesel fuel, and other flammable materials not affected by freezing.

STS Storage Shed

This is a small wooden building used to store equipment for the Houston County Sentence-To-Serve crew which is based out of Beaver Creek Valley State Park.

Miscellaneous Storage Shed

This is a small wood frame building used to store recyclable materials such as aluminum cans, paper, cardboard, glass, and plastic containers until taken to the local recycling facility.

Roads

The park contains approximately one mile of paved entrance road which is Houston County Highway County 1. The park also contains approximately one mile of gravel road which serves the picnic area and campgrounds. A large gravel visitor parking lot is located in the picnic area, and a small gravel visitor parking lot is located at the remote north end of the park. Access to this remote north end lot is limited after substantial rains due to a non-maintained township road leading to it. Deep ruts in the road and muddy conditions limit the type of motor vehicles that can access the parking lot. The Houston County Highway Department maintains and plows the paved park entrance road during winter months. Park staff maintains the interior gravel park road and plows a small area in the picnic ground parking for winter visitors. The gravel campground road is not plowed during winter months.

NATURAL RESOURCES

COUNTY LAND USE

Agriculture is the dominant economic resource in Houston County. Agriculture and associated agricultural operations provide support for the population and towns.

The breakdown of Houston Counties resources are as follows:

Forested Land	38%
Water	less than 1%
Pasture	9%
Cropland	43%
Urban	10%

source: Houston County Water Management Plan 1996

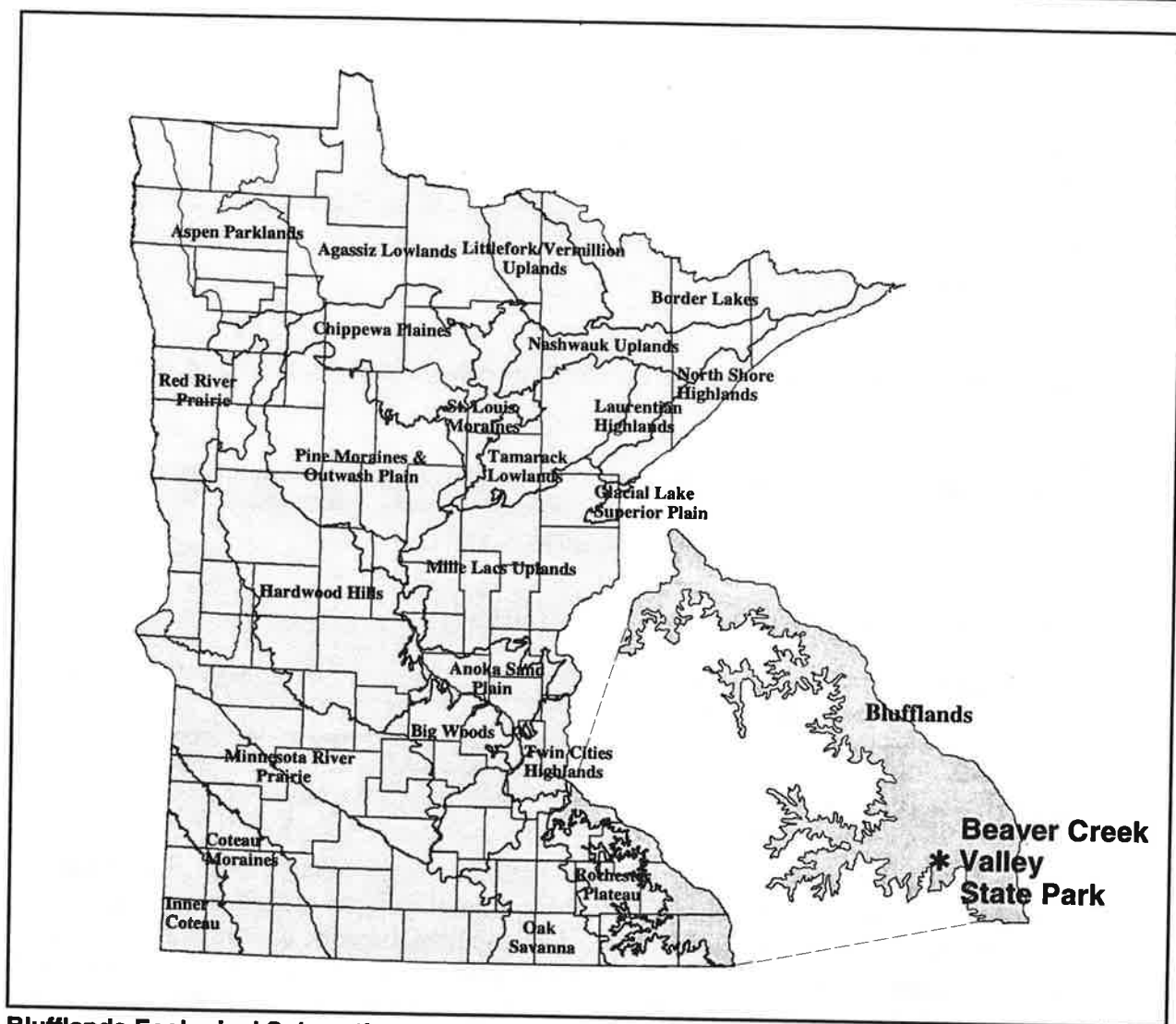
BLUFFLANDS ECOSYSTEM

Beaver Creek Valley is located in the Blufflands Landscape Region in the southeastern tip of Minnesota. Its range extends from Red Wing, south along the Wisconsin border to the Iowa border. This part of the state, for the most part escaped the last period of glaciation, the Wisconsin glaciation of the Pleistocene (Glacial) period 10,000 years ago. The driving force responsible for the topography of this area has been the Mississippi River and its tributaries. The meandering river has left behind terraces in the valleys, revealing the paths of past stream channels left behind by downcutting streams. Marschner (1974) indicates that the vegetation at the time of European settlement was predominantly Big Woods. River bottom forest, oak openings and barrens and some prairie also occur. Northern and western-most species typically found in deciduous biomes of the eastern and southern United States are also found in this region.

This area remained relatively untouched by the most recent glacial advances. The winding river and stream valleys that transect the area were cut by glacial meltwater. The uplands have rich agricultural soils and the valley walls and floodplains are characterized by hardwood forests.

Tallgrass prairie and bur oak savanna were major vegetation types on ridge tops and dry upper slopes. Red oak, white oak, shagbark hickory, and basswood grew on moist slopes, while red oak, basswood, and black walnut forests grew in protected valleys. Prairie was restricted primarily to the broader ridge tops, where fires could carry, but also occurred on steep slopes with south or southwest aspect.

Today about 30 percent of this subsection is cropped, 20 percent is in pasture and 50 percent is in woodland (Dept. of Soil Science, Univ. of Minnesota, 1973). In Minnesota, Wheeler et al. (1985) found species characteristic of oak openings and barrens to be abundant (based on herbarium collections).



Blufflands Ecological Subsection

CLIMATE

Beaver Creek Valley is affected by the same weather patterns which are responsible for the climate of the entire state. Minnesota experiences a continental climate which is influenced by cold Arctic air masses in winter months and warm Gulf of Mexico air masses in summer months.

Because of its southern location in the state, Beaver Creek Valley experiences winter temperatures which average 10°F warmer than the northern third of the state. However, summer temperatures are comparable with the rest of the state. Because of the moderate temperatures in Beaver Creek Valley, the camping season usually begins two earlier in the Spring and lasts two weeks longer in the Fall than the northern portion of the state.

This portion of southeastern Minnesota is less likely to maintain a snow cover suitable for recreational purposes as a result of the warmer winter temperatures, topography, and wind.

The following data were recorded in Caledonia, 6 miles from the park.

Average Temperatures

	Mean Minimum	Mean Maximum
Winter	4°F (-15.7°C)	24°F (-4.5°C)
Summer	58°F (14.6°C)	
	84°F (29.1°C)	

An average of 34 days/year are 0°F (-17.9°C) or below (from the Austin recording station).

An average of 10 days/year are 90°F (32.5°C) or above (from Austin recording station).

Average snowfall is 35-40 inches per year (87.5-100 cm).

The Total Annual precipitation is 32 inches (80 cm).

SOURCE: Keuhnast, Earl L. 1972. *Climates of the States*. U.S. Department of Commerce, *Climatology of the United States* no. 60-21.

MICROCLIMATE

A microclimate is a smaller, distinct climate within a larger climate area. Within the park, there are several microclimates resulting from the nature of the topography. There are different microclimates on the slopes depending on directional orientation. These differences are caused by the amount of sun which reaches the surface - the most dramatic is between the north and south facing slopes. Vegetation is the most visible indicator of these differences. Prairie grasses grow along the Quarry trail, a warm, dry, sunny, south-facing slope. Mosses and liverworts grow in abundance along the Emergency Trail, a shady, cool, moist, north-facing slope.

The Valley also affects the snow cover, which is an advantage to trail users. Snow conditions are better in the valley than on the bluffs because less blowing and drifting occurs and there is more protection from the sun.

GEOLOGY AND MINERALS

The geologic setting of the region encompassing the park is a relatively flat plateau. The plateau, at a general elevation of 1200 to 1300 feet above sea level, is composed of relatively horizontal layers of sedimentary bedrock covered by a thin veneer of scattered remnants of unconsolidated glacial drift and loess (Runkel, 1996). The glacial drift in Houston County is older than the Late Wisconsinan drift common throughout the rest of Minnesota. Stream erosion created deep, steep-sided valleys. The valleys contain alluvium deposits, composed of erosion of the bedrock and the unconsolidated sediments, that are up to 150 feet thick.

The age and elevation of the Mississippi River valley, into which Beaver Creek flows through the Root River system, played an important role in forming the landscape of the park area. The elevation today near the confluence of the Root River and the Mississippi River is roughly 640 feet above sea level. Thus, the relief of roughly 600 feet from the plateau to the Mississippi River provided the energy for the local streams and rivers to erode the deep valleys into the plateau. Well records show that the current Mississippi River valley has thick alluvium deposits. Hence, it was at a much lower elevation at certain times during the Quaternary. The present Mississippi River valley here is proposed to have been created during the Quaternary when tremendous volumes of glacial meltwater carved it. The age of the Mississippi Valley here is not well constrained, but is likely to be in the range of 0.5 to 2.0 million years ago. The tributary streams and valleys are younger than the Mississippi. Thus, the age and elevation of the Mississippi River valley largely controlled the erosion of the plateau of the park area.

The bedrock layers exposed in the sides and bottom of the valley in the park area are sediments that were deposited in the time frame roughly 520 to 440 million years ago in an inland sea called (by geologists) the Hollandale Embayment. From the youngest on top, there are four formations called the Prairie du Chien Group, the Jordan Sandstone, the St. Lawrence Formation and the Franconia Formation. Although lesser amounts of other rock types are present, in general the Prairie du Chien is dominantly dolostone, the Jordan is dominantly sandstone, the St. Lawrence is siltstone and dolostone separated by thin shale beds, and the Franconia is sandstone, shale and dolostone. A geologic time (system) boundary occurs here between the Lower Ordovician Prairie du Chien Group and the Upper Cambrian Jordan Sandstone.

No sinkholes nor lead - zinc mineralization are reported in the park, but these features occur in a similar geologic setting nearby within Houston County.

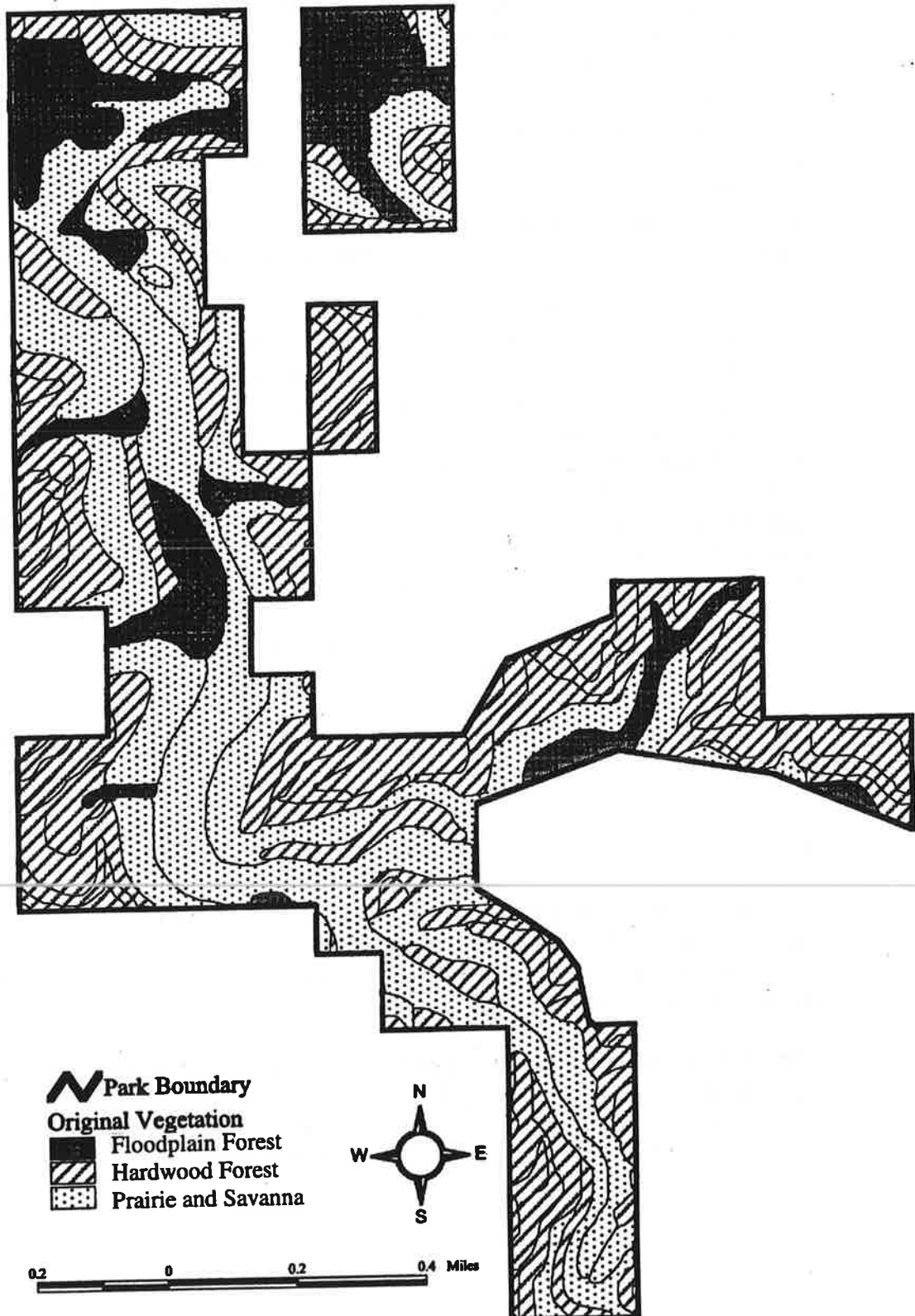
Source: *Minnesota Geological Survey Open File Report 96-4, 1996, Bedrock Geology of Houston County, by Anthony Runkel.*

SOILS

Soils in the general area of Beaver Creek State Park give a picture of how the park fits into the broader landscape region. The Blufflands ecological subsection is a mosaic of Mollisols (soils developed under upland grasses or wetland vegetation); Alfisols (soils developed under savanna and forest vegetation); and Entisols in the floodplain.

There are a variety of soils types in Beaver Creek Valley State Park. However, most of the soils are silty or silty loam type soils formed under hardwood forest or prairie vegetation. In addition, most of the soils have moderate to severe limitations for development. Development potential for the park is limited generally due to the steep slopes found throughout the park.

Beaver Creek Valley State Park Soil Types and the Vegetation Present at the Time of Soil Development



[illegible]

**Beaver Creek Valley State Park
Soil Limitations and Original Vegetation When Soil Formed**

Map Units	Description	Slope	Original Vegetation**	High Water Table	Septic Tank Absorption Fields	Buildings*	Roads	Camp Areas	Picnic Areas	Playgrounds	Paths & Trails	Lawns & Landscaping	Overall Suitability
16	Ardenville silt loam	-	Floodplain	0-0.50	S	S	S	S	L	M	L	M	S
25	Becker sandy loam	-	Prairie	>4.0	S	S	M	S	L	L	L	L	L
103B	Seaton silt loam	3-8%	Hardwood	>4.0	L	L	S	L	L	M	L	L	L
103C2	Seaton silt loam	6-12%	Hardwood	>4.0	M	M	S	M	M	S	S	M	M
103D2	Seaton silt loam	12-20%	Hardwood	>4.0	S	S	S	S	S	S	S	S	S
250	Kennecook silt loam, occasionally flooded	-	Prairie	2.0-5.0	S	S	S	S	L	M	L	M	S
209	Richwood silt loam	0-2%	Broadleaf B	>4.0	L	M	S	L	L	L	L	L	L
306C2	Seaton silt loam, valleys	6-12%	Hardwood	>4.0	M	M	S	M	M	S	S	M	M
306E	Seaton silt loam, valleys	20-30%	Hardwood	>4.0	S	S	S	S	S	S	S	S	S
455B	Festina silt loam	2-8%	Broadleaf A	>4.0	L	M	S	L	L	M	L	L	L
457E	Lacrescent flooz loam	20-35%	Prairie	>4.0	S	S	S	S	S	S	M	S	S
457G	Lacrescent cobbly silty clay loam	45-70%	Prairie	>4.0	S	S	S	S	S	S	S	S	S
471	Root silt loam	-	Floodplain	0-2.0	S	S	S	S	S	S	S	S	S
480	Brooks cobbly fine sandy loam, rocky	45-70%	Prairie	>4.0	S	S	S	S	S	S	S	S	S
500C2	Blackhammer-Southridge silt loams	6-12%	Hardwood	>4.0	S	M	S	M	M	S	S	M	M
500D2	Blackhammer-Southridge silt loams	12-20%	Hardwood	>4.0	S	S	S	S	S	S	S	S	S
504F	Lamelle-Dorset silt loam	30-45%	Hardwood	>4.0	S	S	S	S	S	S	S	S	S
506C2	Nodine-Hollingsworth silt loams, eroded	6-12%	Hardwood	>4.0	S	M	S	M	M	S	S	M	M
506D2	Nodine-Hollingsworth silt loams, eroded	12-20%	Hardwood	>4.0	S	S	S	S	S	S	S	S	S
502E	Lamelle-Eberville silt loams	20-30%	Hardwood	>4.0	S	S	S	S	S	S	S	S	S
502F	Eberville silt loam	30-45%	Hardwood	>4.0	S	S	S	S	S	S	S	S	S
506H	Bayanville-Ardenville complex	1-12%	Floodplain	>4.0	S	S	S	S	S	S	S	M	S
604	Huntsville-Beaver Creek silt loam	-	Prairie	>4.0	S	S	S	S	L	S	S	M	S
1812	Terril loam, sandy substratum	-	Prairie	>4.0	L	S	M	L	L	M	L	L	L
1990	Walton silt loam	0-3%	Broadleaf A	1.0-3.0	S	S	S	S	M	S	M	S	S
1990C	Beaver Creek Variant silt loam	3-8%	Floodplain	>4.0	S	S	S	S	M	S	L	M	S

Chart Legend:
Soils Suitability Characteristics
L = (Low) Limitations for a stated use are minor and can be overcome easily.
M = (Moderate) Limitations for a stated use can be overcome by special planning, design, or intensive maintenance.
S = (Severe) Limitations for a stated use generally require a major soil reclamation, special design, or intensive maintenance.
*Based on buildings with a basement or foundation.
**Original Vegetation
Hardwood - True alled (Typic and Glosic)
Broadleaf A - Mollis Integrated affluents (Mollis sub-group)
Broadleaf B - Forest influence mollisols (Argudol)
Prairie - True mollisols (Typic and Cumulic)
Floodplain - Soils that flood (Frequently or Occasionally)

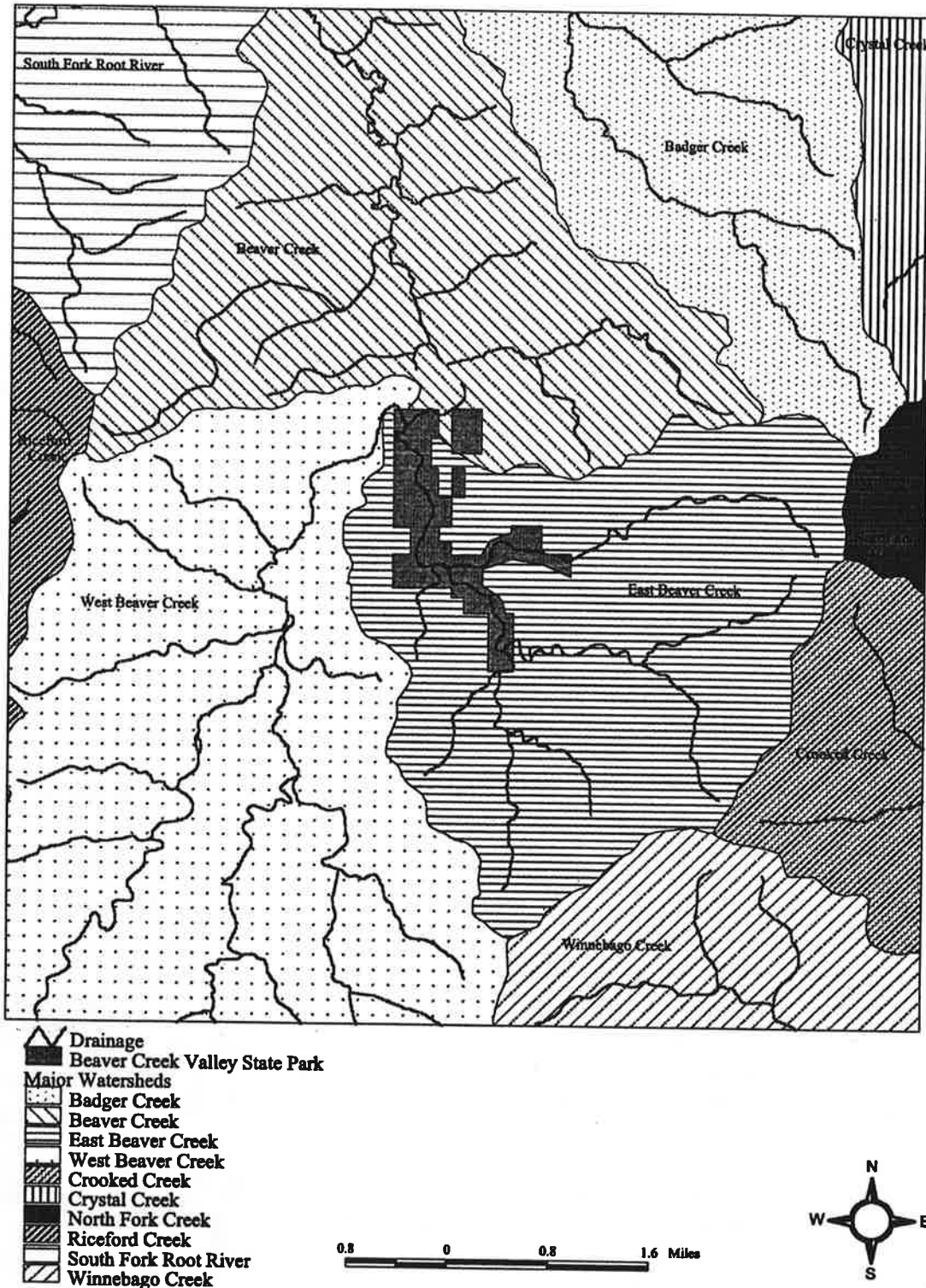
WATER RESOURCES

Beaver Creek Valley State Park is located within four major watershed units, all eventually draining to the Mississippi River. The four major watersheds are as follows: Mississippi River (LaCrescent), Root River, Mississippi River (Reno) and Upper Iowa River. Only one of the four major watersheds lies completely within Houston County, the Mississippi River (Reno). The watershed system also contains approximately 47 minor subwatersheds. The karst (dissolved limestone) characteristics of the area create a highly complex drainage system.

The largest watershed, by total area, is the Upper Iowa River (578,714 acres). The Root River which contains 403,278 acres is the second largest watershed but is the largest in overall area within Houston County. Northeast of Beaver Creek Valley State Park is the Mississippi River (La Crescent) which totals 373,544 acres in size. The Mississippi River (Reno) is the smallest watershed in overall size totaling 235,434 acres.

Beaver Creek Valley State Park is one of the most biologically rich sites in southeastern Minnesota with more than 350 acres of high quality natural communities and a significant number of rare species records (Houston County Water Management Plan 1996). The quality of these resources is influenced by the condition of the watershed.

Beaver Creek Valley State Park Drainage and Watersheds



NATURAL COMMUNITIES

Eleven types of natural communities have been identified and mapped within the park. The quality of these communities varies from minimal disturbance to almost no native species present. These natural communities support a variety of plants, animals, soil types and microclimates including numerous endangered, threatened and special concern species.

Region 5 State Parks cooperated (provided additional funds) with the Minnesota County Biological Survey (MCBS) between 1992 and 1993 to intensify inventory efforts in Beaver Creek Valley State Park during their survey of Houston County. The MCBS cooperative effort provided Region 5 parks the opportunity to collect more comprehensive biological data about Beaver Creek Valley to assist in decisions regarding the proposed bike trail, the trout stream habitat improvement project, resource management and interpretation and future planning. A unique advantage to working with MCBS during the county survey is that the significance of the park's resources can be more easily viewed with respect to the rest of the county and the Blufflands landscape region. A more comprehensive description of natural communities was determined from which to provide direction for resource management actions. Results of the survey document that Beaver Creek Valley State Park is one of the most biologically rich areas in Houston County and southeast Minnesota.

The following natural community descriptions are summaries of the MCBS report "Inventory of Biological Features in Beaver Creek Valley State Park, Houston County, Minnesota."

Maple Basswood Forest - The maple basswood forest comprises the richest flora in the park. Minimal disturbance has allowed several species characteristic of maple basswood forests to flourish. Rare plant species in the forest include: Twin leaf (*Jeffersonia diphylla*), Squirrel-corn (*Dicentra canadensis*), and Moschatel (*Adoxa moschatellina*). One of only three Maple basswood forests of this quality in the county portions of it may meet the criteria as "old growth" forest.

Lowland Hardwood Forest - Terraces composed of deep alluvium drain off the excess waters of flash flooding that frequently occur. Because of this drainage the forest is classified as a Lowland Hardwood Forest rather than a floodplain forest. This process encourages a combination of species that are tolerant of short-term flooding and favor deep, moist soils. The following is a list of species commonly found in a lowland hardwood forest: sugar maple, black walnut, bur oak, cottonwood, and willows. Black locust (*Robinia pseudoacacia*) and black willow (*Salix nigra*) are two of many species found in the forest that are shade intolerant.



Mature black walnut tree in Lowland Hardwood Forest.

East Beaver Creek and adjoining lowland hardwoods - The extensive, mature, closed-canopy forest along Beaver Creek provides an important habitat feature for many of the rare animals of the Park. The Louisiana waterthrush, Cerulean warbler, Acadian flycatcher, Woodland vole, and Pickerel frog are all found in this community. Degradation of stream valleys elsewhere in Houston County has greatly reduced the amount of habitat of similar quality outside the Park. The most significant portion of Beaver Creek Valley within the Park is the section located between the picnic area and the southern end of the old field, and the forested north-facing slopes of the valley.



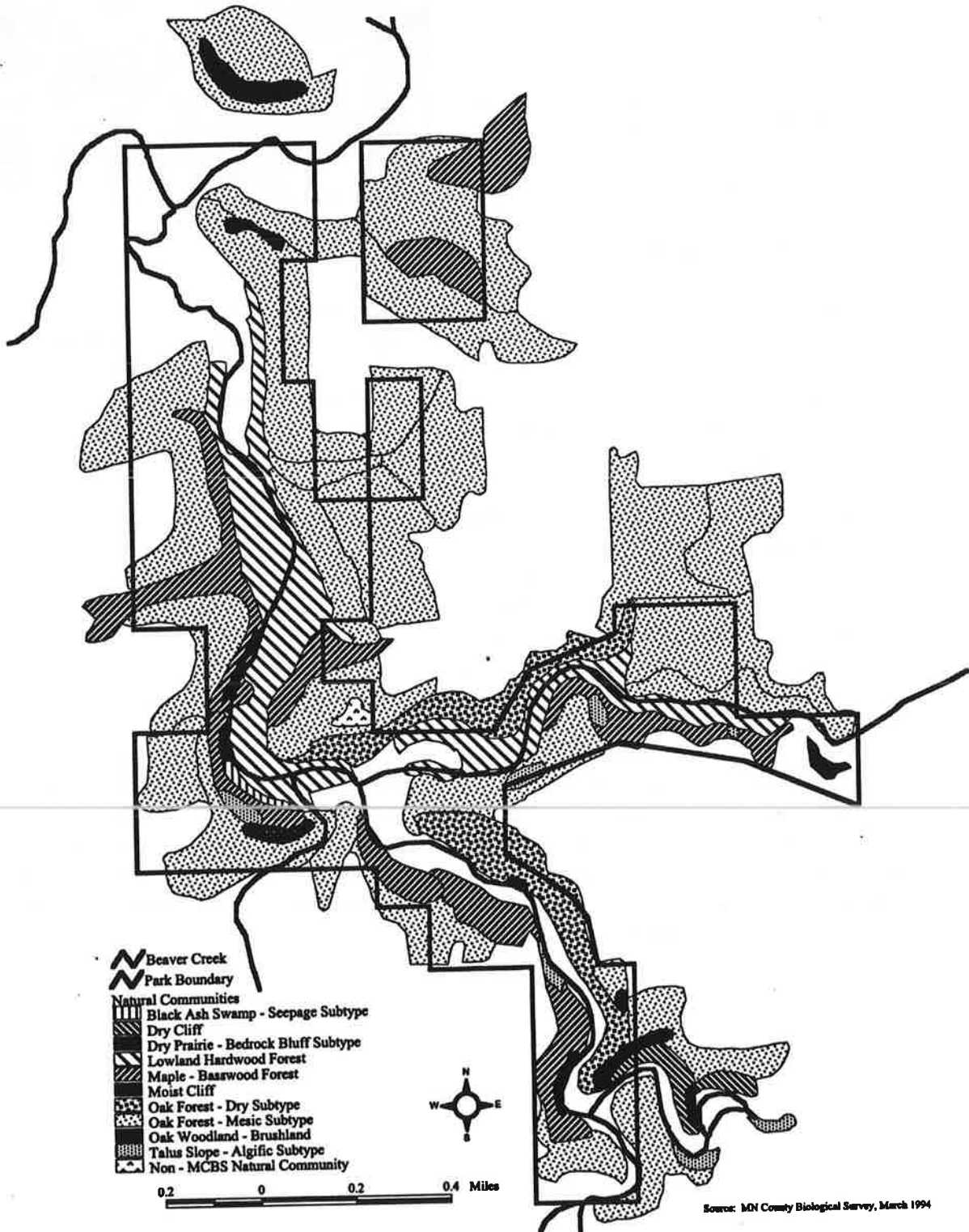
Typical view of East Beaver Creek.

East Beaver Creek is a small, cold water stream averaging 6 - 9 feet wide. As reported in the 1998 Stream Management Plan, just 10 fish species have been collected throughout the survey history of the stream. This represents average species diversity for the coldwater streams of southeast Minnesota. None of the species currently hold a special status in Minnesota. However, brown trout, and a population of native brook trout are the most common and provide high quality fishing opportunities for park visitors.

Black Ash Swamp (seepage subtype) and Moist Cliff - The community consists of a variety of wetland plants and upland ephemerals. It also has one of the largest varieties of fern species in Houston County including narrow-leaved spleenwort (*Athyrium pycnocarpon*), Silvery spleenwort (*Athyrium thelypteroides*), and Goldie's fern (*Dryopteris goldiana*). The seepage subtype contains a significant amount of rare plant species including the state endangered bog bluegrass (*Poa paludigena*).

Dry Prairie (bedrock bluff subtype) and Dry Cliff - Bluff prairies are typically found on south and west facing rocky bluffs that are hotter and moisture conditions are drier. Past grazing is the basis for large amounts of degradation to most prairies within Houston County. This is also true for Beaver Creek Valley State Park. Much of the prairie land is now overgrown with woody shrubs and trees. The bluff prairies in the park are small remnants, the largest and best are on state owned land just above the group camp. Illinois tick trefoil (THR) is found on this prairie.

Beaver Creek Valley State Park Natural Communities



Oak Forest (dry and mesic subtypes) and Oak Woodland/Brush land - The oak forest is classified into three types based on a moisture continuum from mesic to dry. In moist areas of the mesic subtype, red oak (*Quercus rubra*) is dominant. Bur oak (*Quercus macrocarpa*) and white oak (*Quercus alba*) dominate the dry subtype in areas of dry rocky soil with south and west exposures. Dry-mesic communities with loamy soils on upper slopes and crests and inclusions of both mesic and dry areas such as ravines or cliff edges were classified as "oak forest". Species found in maple basswood communities are also found in the mesic oak forest. Species that typically inhabit the remnant savanna or prairie are commonly found in the dry oak

Algific Talus Slopes - Algific Talus Slopes are one of the rarest natural community types in Minnesota. Algific talus slopes are so fragile that mere walking upon them can cause irreparable damage. Soils on the steep-sided bluffs are extremely vulnerable to erosion. Several species of land snails are found only in Algific talus slopes. One of the talus slopes in Beaver Creek Valley State Park contains the only known population of golden saxifrage in Houston County. This plant is "widely distributed in the arctic" but in the continental United States, it is found only on "cold air slopes" within the Blufflands.



Algific Talus Slope located below rock outcrop.

ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES

While many natural communities and rare species were known to exist in the park prior to 1992, the MCBS survey verified and documented reports and historical records. In addition the survey discovered numerous new rare features and species and locations of previously known ones. Species listed as endangered or threatened are protected under Minnesota Rules, Chapter 6134, Parts 6212.1800 to 6212.2300. Species of special concern are not protected by law however, within the state park all native species are considered important in the ecosystem and all projects that potentially affect these resources undergo resource assessment or environmental review.

Endangered, Threatened and Special Concern Species found in Beaver Creek Valley State Park

Birds

Cerulean warbler	Endangered candidate
Louisiana waterthrush	Special concern (State)
Acadian flycatcher	non-listed rare; regional interest
Veery	non-listed rare; regional interest

Reptiles

Timber rattlesnake	Threatened (State)
Five-lined skink	Endangered (State)

Mammals

Woodland vole	Special concern
---------------	-----------------

Plants

27 species

WILDLIFE

Beaver Creek Valley State Park supports a variety of rare, as well as common, animal species. The climate in southeastern Minnesota is milder than the rest of the state. Because of the climate, southeastern Minnesota is able to support the greatest diversity of wildlife in the state. This part of the state, due to its favorable habitat, climate, and proximity to the Mississippi River also supports the greatest diversity of herpetofauna (amphibians and reptiles).

Birds - The extensive lowland hardwood forests in the park are home to many rare birds such as the Acadian flycatcher (*Empidonax virescens*), Louisiana waterthrush (*Seiurus motacilla*), and Cerulean warbler (*Dendroica cerulea*). The MCBS bird surveys resulted in the detection of 62 species in the park during the breeding season. The 62 species include rare species, such as the Louisiana waterthrush (*Seiurus motacilla*), a state special concern species, and the Cerulean warbler (*Dendroica cerulea*), a candidate for federal listing.

Reptiles and Amphibians - Bluff prairies and rock outcrops commonly found in the park, provide habitat for many of the reptile species found in the region. The 1994 MCBS survey within the park revealed a total of eight species; five amphibians and three reptiles. The Five-lined skink (*Eumeces fasciatus*), the Pickerel frog (*Rana palustris*), and the Timber rattlesnake (*Crotalus horridus*) are three of the eight species found in the park.

Mammals - A total of 18 mammal species were recorded by MCBS from Beaver Creek Valley State Park. Typical species found in the lowland hardwood forest include the Northern short-tailed shrew (*Blarina brevicauda*), the Eastern mole (*Scalopus aquaticus*), and the Woodland vole (*Microtus pinetorum*). Upland forests provide habitat for the big brown bat (*Eptesicus fuscus*), Red bat (*Lasiurus borealis*), Eastern cottontail (*Sylvilagus floridanus*), Raccoon (*Procyon lotor*), and Striped skunk (*Mephitis mephitis*). The prairies, pastures, and old fields are habitat for the Meadow vole (*Microtus*

pennsylvanicus) and the Meadow jumping mouse (*Zapus hudsonius*). Habitat generalists include the coyote (*Canis latrans*) and the white-tailed deer (*Odocoileus virginianus*).

Fish - The quality of East Beaver Creek as a trout stream is extremely high. A major habitat improvement project was completed on East Beaver Creek in 1971. Since the improvements were made, an increase in natural reproduction of brown trout (*Salmo trutta*) has been noted during sampling of the stream fish populations. This project, along with improvements in land use and water quality, changed East Beaver Creek from a stocked trout stream to a self sustaining stream with adequate natural reproduction. Severe flooding since the original project damaged some of the improvements and in 1996 another habitat improvement project was completed to repair some of the damaged areas and to do some additional work on the lower end of the stream. The stream supports a variety of other fish species including white sucker (*Catostomus commersoni*), slimy sculpin (*Cottus cognatus*), and johnny darter (*Etheostoma nigrum*).



White tailed deer are common in the park.

CULTURAL RESOURCES

Archaeology -There are no known archaeological sites recorded in the park. However, to date there has not been a systematic archaeological survey done on the entire park. A limited archaeological field investigation was conducted in 1996 in conjunction with stream habitat improvement work done that year. At that time it was determined there is a high potential for archaeological sites being located within or near the stream habitat improvement project area based on review of state archaeological site records and reviewing recorded site locations north of the park. Six recorded archaeological sites are located in a 1.5 mile square area south of Sheldon, and west of the north end of the park. These sites are situated on terraces within the Beaver Creek Valley flood plain, similar to floodplain located within the park. No archaeological sites were discovered in the 1996 survey, but since the survey only covered a small portion of the floodplain, the potential for additional sites remains high.

V. ECOSYSTEM BASED MANAGEMENT, AND NATURAL AND CULTURAL RESOURCES MANAGEMENT

ECOSYSTEM BASED MANAGEMENT

Beaver Creek Valley is located on the western boarder of the Blufflands and the southeastern border of the Southern Oak Barrens subsections of the Ecological Classification System (ECS), (see ECS map page 20). Minnesota's ECS stresses the interrelationships among components of the ecosystem. These components include climate, geology, geomorphology, parent material, soil, vegetation, hydrology, and land history.

Ecosystem-based management is the process of managing for sustained ecosystem integrity through partnerships and interdisciplinary teamwork. Ecosystem-based management focuses on three interacting dimensions: the economy, the social community, and the environment. Ecosystem-based management seeks to sustain ecological health while meeting socioeconomic needs.

Ecosystem-based management requires that DNR interdisciplinary teams work with the public to develop and implement sustainability goals for entire ecosystems.

NATURAL AND CULTURAL RESOURCES MANAGEMENT

The goal of natural and cultural resources management in Beaver Creek Valley State Park is to protect and sustain significant natural, and cultural resource features of the park.

The objectives and recommendations that follow are intended to provide general direction for the resources management activities that will be conducted in the park. Annual work planning meetings will use these recommendations to set short term goals and priorities. Some management activities are quite specific. In those cases, we are very familiar with the resources, and we know the steps needed to ensure their maintenance. Other resources we know less about; specific management actions will be developed as better information is obtained. Soils, water, and other physical factors in the park will have a major influence on natural resources management and direction. Management decisions are also influenced by understanding the significance of the resources of Beaver Creek Valley State Park in the Blufflands Landscape. Beaver Creek Valley State Park is one of only a few places in Houston County where some rare species or communities are found. Cultural resources management will be influenced by known historical and archaeological features in the park, and by information that is obtained by future field surveys and literature searches.



Squirrel Corn.

NATURAL RESOURCES MANAGEMENT OBJECTIVES

Natural Community Management

The emphasis for natural resources management in Beaver Creek Valley State Park is to focus on managing for natural communities rather than for individual species. In some instances rare species may be the focus because of their protected status. General management objectives for the natural communities in Beaver Creek Valley are to maintain them in a healthy functioning condition. Management actions that apply to all communities include the following:

Action: Monitor and document populations of rare species.

Action: Maintain or increase populations of rare species.

Action: Monitor and document populations of problem species.

Action: Remove or control problem species.

Action: Use plant materials that are native to Beaver Creek Valley. The genetic material should come from a certified local source.

Action: Work with adjacent landowners, if interested, to do collaborative and complimentary resource management where appropriate and feasible. Cooperative activities may include assistance in preparing Land Stewardship Plans, providing resources management information, or actually providing management assistance.

Action: Provide resources management interpretation where appropriate, and needed.

Action: Employ natural phenomena such as fire to manage the parks resources whenever possible.

Maple Basswood Forest

The soils in this natural community are highly erodible, and cannot withstand extensive off-trail hiking. Casual hiking in this area should be discouraged. Erosion and sedimentation could destroy plant populations and encourage weeds. Also, rare herbaceous plants are generally adapted to low light levels and high available moisture. Management practices which result in increased light to the forest floor may favor common woodland plants over rare species.

Action: Limit recreation development, and activity in this community.

Action: Evaluate to determine if Maple-Basswood stands qualify for old-growth or future old-growth. If stands do qualify, they should be managed under old-growth guidelines.

Lowland Hardwoods

The lowland hardwood communities vary greatly in quality and level of past disturbance. Management of specific areas depends on the quality of that site and the habitat requirements of the species affected. For example, Moschatel (*Adoxa moschatellina*) prefers well drained rich forests with closed canopies (high moisture, low light).

Action: Eliminate alien species. Black locust should be cut and treated to prevent resprouting. Exotic flowers should be removed from the park entirely (i.e., day lilies



Black locust, one of the problem species that needs to be controlled.

(*Hemerocallis fulva*), cultivars of lilies (*Lilium spp.*), Dame's rocket (*Hesperis matronalis*). The water cress (*Nasturtium officinale*) is an introduction but it will probably be unfeasible to eliminate.

East Beaver Creek

The Division of Parks and Recreation will coordinate with the Section of Fisheries and other affected department units to manage the East Beaver Creek ecological community. The East Beaver Creek ecosystem will be managed as one of the premier trout fisheries in Minnesota without compromising the diverse ecological community or other unique resources present.

Action: Conduct annual inspections of the improvement zone to document recovery of the area and to monitor the condition of improvement structures, particularly after severe floods.

Action: Monitor plant, and animal populations within habitat improvement areas.

Action: Insure that any future trout habitat improvement projects are consistent with the Department of Natural Resources objective of protecting endangered, threatened, and special concern species.

Action: Any future habitat improvement projects or fisheries management activities will follow the coordination guidelines in the Memorandum of Understanding (MOU) titled GENERAL COORDINATION GUIDELINES between the DIVISION OF PARKS AND RECREATION and the SECTION OF FISHERIES on ACTIVITIES RELATED TO OR AFFECTING FISHERIES RESOURCES IN STATE PARKS.



Big Spring, the source of East Beaver Creek.

Black Ash Swamp

The plant assemblages of this community vary mostly because of available moisture. Saturated soils inhibit the growth of some species of trees, resulting in small open wetlands. In better drained substrates, a dense forest canopy enables ferns to thrive. Management of areas within this community should be species specific. Public use of this area should not be promoted.

Action: Discourage public use because of their sensitivity of the black ash swamp community's sensitivity to disturbance .

Dry Prairie

The remnant prairies need active removal of brush in conjunction with prescribed burns to stimulate prairie growth.

Action: Prepare a fire management plan and implement a prescribed burn program for the dry prairie community.

Oak Forest

Vegetation notes in the 1853 public land survey in Beaver Creek Valley suggest that the canopies of the oak forest were similar to present conditions. Much of the oak forest is site specific and therefore general prescriptions are impractical.

Action: Evaluate to determine if oak forest stands qualify for old-growth or future old-growth. If stands do qualify, they should be managed under old-growth guidelines.

Action: Prepare a fire management plan and implement a prescribed burn program for the oak forest community.

Algific Talus Slopes

Because algific talus slopes are dependant upon sinkholes and fissures which may be some distance away, efforts should be made to protect the sinkholes from activities which prevent cold air flow or contaminate the water which seeps into the natural community.

Action: Discourage public use on the algific talus slopes because of their sensitivity to disturbance.

Old Field

Soils indicate that open grassland was once a common natural community found on the floodplain of Beaver Creek. Very few undisturbed open grasslands remain. The old field area in the northern portion of the park should continue to be managed as an open grassland because of its value of the diversity it provides to wildlife.

Action: Manage as open grassland in floodplain using fire, and selective herbicides to retard brush encroachment.

CULTURAL RESOURCES MANAGEMENT

Cultural Resources Survey

The Beaver Creek Valley State Park area is rich in archaeological and historic resources, however much of the park has never been formally surveyed. In addition several of the archaeological sites known from the literature, and local historic sites are located outside the park.

Action: Survey for cultural resources in park use areas and on future additions to the park.

Action: Continue to survey for cultural resources in areas where facilities are being developed in the park, and in resource management project areas.

Culture Site Mapping

New methods of recording, and maintaining an accurate location of physical resources within parks has become available to resource managers in the last few years. One of the best is the Department of Natural Resources, Geographic Information System.

Action: Register the location and pertinent relational data for each cultural resource property on the Department of Natural Resources, Geographic Information System.

VI. RECREATION RESOURCES MANAGEMENT

RECREATION RESOURCES MANAGEMENT OBJECTIVES

The objective of the Minnesota State Park System is to provide appropriate recreational opportunities while maintaining the natural resources unimpaired for future generations. All recreational objectives at Beaver Creek Valley State Park must fit within that guideline.

At Beaver Creek Valley State Park, overnight visitors comprise a relatively large percentage of the total guest compared to other state parks with similar annual attendance. Of the total attendance at Beaver Creek Valley, approximately 21% are overnight visitors, compared to 11% for parks statewide. This over representation by campers is a reflection of the popularity of the park as a week-end destination camping park, and the wealth of resources that draw campers to the park. The high percentage of overnight visitors may also be skewed somewhat due to the lack of a reliable traffic counter and the current use of an out-dated formula for computing attendance figures for the park. Total park attendance is undoubtedly much higher than is currently being recorded.

Due to the wealth of natural resource found in the park which need constant protection, and the fact that limited space is available for further development due to the rugged topography, Beaver Creek Valley State Park should remain the same as it is now with only minor development and improvements.

With the exception of the 8 mile network of hiking trails throughout the park, most park use is highly concentrated in the campgrounds and picnic area which were developed along the valley floor and surrounded by steep, rugged, forested hillsides and bluffs.

Present day recreation management at Beaver Creek Valley State Park provides appropriate, although limited, recreational opportunities while protecting the natural resources for use and enjoyment of future generations. Due to the rugged topography and limited space for development, no major development or park expansion is being proposed at this time. This will insure that the park remains relatively the same in the future as it is now with only minor development and improvements. This is in keeping with the objective of the Minnesota State Park system.

PROPOSED DEVELOPMENT

DAY USE FACILITIES

Trails

Caledonia to Houston Bike Trail

With the continued eastward expansion of the Root River State Trail, there has been local interest in a bicycle trail connection between Caledonia and Houston. Included in this trail proposal is a possible route connecting to Beaver Creek Valley State Park.

It was suggested early in the planning process that the DNR establish a position on the proposed state trail through BCVSP early on in the trail planning process so that all parties involved would know up front where the DNR stands on this issue.



The policy on state trails by the DNR Division of Parks and Recreation is that it encourages connections to state parks and would provide services to trail users. The North Shore State Parks and Sakatah Lake State Park are good examples of this policy. A trail connection to the Caledonia-Houston Trail is certainly in line with this policy.

Many visitors to Beaver Creek Valley bring bikes, and use the Root River State Trail.

The DNR has established a position on the proposed trail through BCVSP. After careful review of many factors, it was decided that a bicycle trail through the valley floor of the park following the East Beaver Creek stream corridor of the existing Beaver Creek Valley Trail is not an option.

Many factors were considered before the DNR took up a position on this issue. The valley floor encompassing the East Beaver Creek stream corridor is very narrow. A trail through the valley floor at the south end of the park was also considered. Eliminating popular campground sites or having a state trail share a narrow campground road were determined not feasible options.

Traditional uses of these areas of the park by trout anglers, bird watchers, wildflower enthusiasts, and hikers could be adversely affected by a bicycle trail through this area. Negative impacts upon park resources, visitor safety, cost, physical limitations, possible wetlands, and fish and wildlife impacts were also considered.

In summary, the DNR has determined that any proposed bicycle trail through the narrow, low-lying valley floor of the park is not an option.

Action: Options for a trail with a spur trail connection from BCVSP to the proposed Caledonia-Houston Trail are encouraged. All options will be carefully assessed when they are proposed.

Picnic Area

The picnic area is in good shape, and serves park visitors well. It is large enough, has easy access from the parking lot, and it can accommodate both small and large groups. The only minor improvement being proposed is to add one or two small picnic shelters near the parking lot. The existing picnic shelter across the swinging bridge is located too far from the parking lot to be used by many people, and is not accessible to others.

Action: Add one or two picnic shelters near the picnic area parking lot. They should be small open shelters, that protect about six to eight picnic tables from the sun and rain.

The existing stone picnic shelter works well for large groups such as school groups and family reunions. But the lighting is bad and does not provide enough shelter during cold windy weather.

Action: Update existing picnic shelter by improving the lighting and adding new doors that can be easily opened or closed as needed.

Picnic Area Sanitation Building

This building is in bad shape and needs to be completely rehabilitated, or replaced to bring it up to ADA standards. The building is also much larger than needed because it was originally built to serve the picnic area and a campground that has since been removed.

Action: Remove the building and replace it with two single vault toilets.

Picnic Area Road and Parking Lot

The road in the picnic area and the parking lot need additional gravel. Heavy rains and failure to continue to add gravel on a regular basis, have resulted in very little gravel remaining for filling potholes and repairing washouts.

Action: Add several inches of gravel to the road, and parking lot in the picnic area.

Big Spring Overlook

One of the most interesting features in the park is Big Spring. At the present time the spring is viewed from an eroding, grassy bank overlooking it. People wanting to get a closer look, climb down the grassy slope to the creek bed causing the bank to erode.

Action: Provide steps down to the spring and an ADA accessible viewing area overlooking the Big Spring.

Playground /Wading Pool Area

The sand area surrounding the kids wading pool is much larger than necessary with much of the area never used. It is also in an open area with no vegetative screening to protect the aesthetics of the picnic area.

Action: Remove surplus sand from the area around the playground and pool, and replace it with topsoil, and seed with grass.

Action: Plant vegetative screening around area to make it more aesthetically pleasing.

Trails

Several sections of the existing 8 mile hiking trail network are in need of rehabilitation. Bridge repairs, additional steps in steep eroded sections, water bars, and erosion control structures are needed on large sections of the trail network. In addition, there is no interpretation of the unique natural resources located adjacent to the trails.

Action: Rehabilitate sections of the 8 mile trails network by repairing bridges, adding steps, water bars, and erosion control structures.

Action: Plan, develop, and implement a self-guided nature trail.

North-end Parking Lot

The parking lot at the north end of the park is in serious need of repair. The parking lot is getting considerably more use since the major trout habitat improvement work that was completed on East Beaver Creek in 1996. There are no regulatory signs such as general park rules or rules for using the lot which results in many unintended park rule violations.

In addition, the lot was poorly designed and constructed. It is poorly drained and does not have a gravel surface which results in a very muddy lot when ever it is wet.

Action: Install signing stating park rules, emergency procedures, and prohibited uses.

Action: Re-grade the parking lot surface for better drainage, add gravel and add cement parking curbs.

OVERNIGHT FACILITIES

Generally the campground is in very good shape. The existing campground offers a wide variety of campsite types, and provides facilities for most camping styles. Campsites range from modern electrified sites, to primitive walk-in campsites. Some additions and improvements are needed in the overnight campgrounds, but no changes are proposed except minor improvements to meet ADA requirements.

Campground Roads and Campsite Parking Spurs

The concrete slab where the park road crosses Beaver Creek is in need of repair or replacement. Large cracks in the concrete have developed and it is becoming unstable. Repairs should be made soon because it may be washed out by high water.

Action: Replace the low-water/cement slab crossing at the campground entrance.

Action: Install culverts, steel grates in low dips in campground road.

The campground road is a single lane road shared by park vehicular traffic, pedestrians, and bicycles. It is often crowded, and heavily used. There is very little gravel remaining on the road which results in potholes and washouts after heavy rains.

Action: Re-grade and add additional gravel to the campground road. Paving is not recommended due to the resulting increased vehicular speeds, and the possibility of chemical runoff into the trout stream.

Action: Add gravel and level campsite parking spurs.

Campground Water System

The campground water system is very old, and in need of costly repairs. It is also inadequate because it does not provide water to the walk-in campsites or to the primitive group camp.

Action: Replace and extend the entire campground water system.

Tent Only Campsites

Some of the most popular camp sites in the park are the tent sites T-1 through T-16.

Generally the campsites are in good shape, but the parking spurs near the sites need to be improved.

Action: Improve the parking spurs in the tent-only campground.

Campground Visitor Parking Objectives

Park users who stop to view the Big Spring or stop to visit campers in the campground area do not have any where to park. At the present time they either use an empty camping spur, or they park along side the campground road. Since the road is a two-way single lane road, it is shared by traffic in both directions this can result in congestion problems

without the addition of cars parked along the side. Space for two or three cars off the road help reduce the congestion problems in the area.

Action: Construct a small visitor parking lot in the Big Spring Campground.

South Campground Parking Lot

Parking problems exist at the south end of the campground where sites T15 and T16 are located. This area serves as the turn around at the end of the campground road, but it also serves as the parking lot for the walk in campsites, and for the three primitive group campsites. It is a small area with a loop turn around road surrounded by mowed grass. Parking spaces are not designated. When large groups are using the group camp, it quickly becomes congested. A properly designed parking lot would reduce congestion, add parking capacity, and reduce parking conflicts that presently exist.

Action: Install a properly designed parking lot at the end of the campground road loop for campers using the 3 primitive group camping areas, the 6 walk-in campsites, and tent-only campsites T-15 and T-16.

Camper Cabins

Although the campground is very popular, the addition of one or two camper cabins would provide unique camping opportunities in the park. Camper cabins have been very popular in parks that have them. Camper cabins would be a good addition to Beaver Creek, and would fit in well with existing camping facilities.

Action: Construct one and possible two camper cabins.



Typical camper cabin used in the state park system.

Primitive Group Camp

The walk in campsites and primitive group camp area are in good shape. The only improvement would be to add a small picnic type shelter in the largest group camp.

Action: Construct a small shelter building in the primitive group camp.

Action: Install two new vault toilets in the primitive group camp.

VII. INTERPRETIVE SERVICES

INTRODUCTION

The Minnesota State Parks and Recreation's interpretive mission is "to provide accessible interpretive services which create a sense of stewardship for Minnesota's natural and cultural heritage by illuminating the changing relationships between people and landscapes over time."

As a division of the Minnesota Department of Natural Resources, the Minnesota State park system seeks to promote increased understanding, appreciation, and enjoyment of natural and cultural resources in Minnesota; assist in protecting each state park's resources; promote public understanding of, involvement in, and support for the Minnesota Department of Natural Resources and its Division of Parks and Recreation; and to increase public awareness of critical environmental problems on a local, state, national and worldwide scope, as a major provider of environmental educational experiences.

This chapter identifies and describes interpretive themes (or stories) that should be told about Beaver Creek Valley State park based on its natural, cultural and recreational resources. The chapter recommends . . . The resources and themes listed in this chapter reflect the importance of those stories as they fit in with the *Minnesota State Park System's Interpretive Services Plan* (1995).

Beaver Creek Valley State Park was determined to have medium to high resource significance with comparatively low visitor use. Currently, the interpretive effort at this park is little to none. The interpretive services plan proposes an increase in nonpersonal efforts and occasional programming from the Area Naturalist.



Interpretive/naturalist giving presentation to park visitors.

Beaver Creek Valley State Park is located in the **Blufflands Landscape Region** in the southeastern tip of Minnesota. This part of the state was affected by the Wisconsin glaciation meltwater of the Pleistocene. It is part of the "driftless" area located in Wisconsin, Iowa, Illinois and Minnesota. The Blufflands provides clues to the geological history occurring between the Paleozoic Era and Pleistocene (Glacial) period. An original vegetation map compiled in 1930 by F. J. Marschner indicated this area was predominantly hardwood forests at the time of European settlement. River bottom forest, and oak savanna occurred. The northern and western-most range extensions of species found characteristically in deciduous biomes of the eastern and southern United States are found in this area. Culturally, this region is difficult to characterize because very little archaeological research has been done away from the Mississippi River Valley. Historically, the area was attractive to European settlement because of the rich agricultural soils and hardwoods and the many streams which made milling possible.

Landscape Regions provide a reference point in time to interpret what resources were here when Europeans arrived, how interactions between people and the land affect each other, and why the landscapes look the way they do today.

INTERPRETIVE CLIENTELE

Groups Requesting Interpretive Programs

1. Local and area elementary school children.
2. Local and area high school students.
3. Area college students.
4. Boy Scout and Girl Scout troops.
5. Civic organizations.
6. Local and area teachers.
7. Local and area environmental groups.
8. Overnight camping guests.

Interpretive Services Target Groups

1. Educational Community.
2. Park users.
3. Visitors interested in native plant communities, ecology, natural history, cultural history, wildlife, birds, forestry, reptiles, amphibian, and fishing resources.
4. Adjacent landowners, and local citizens, groups, and governmental units.
5. Visitors needing information (how to self-register for camping, how to find restrooms, how much things cost, local and area attractions, way we have certain park rules, etc.).
6. Local environmental organizations.

INTERPRETIVE THEMES & PROGRAMMING

Main Themes

Three main themes have been identified at Beaver Creek Valley State Park. They highlight the most obvious aspects of the park's resource identity.

1. The park's rugged topography, steep bluffs, springs, and direction of streams are the products of retreating glacial meltwaters.
2. Beaver Creek Valley State Park protects plants and animals in Minnesota that are more characteristically found in the southern and eastern United States..
3. The East Beaver Creek stream corridor and its associated communities are major resources that make the park attractive to visitors.

Interpretive themes and programing:

Main Theme #1

The park's rugged topography, steep bluffs, springs, and direction of streams are the products of retreating glacial meltwaters.

Sub-themes

- What geological processes were involved in the formation of Beaver Creek Valley State Park?

- What part did glacial meltwater have in shaping this area?
- Beaver Creek Valley State Park is representative of the "driftless area".
- What is the origin of the "Big Spring" and why is it a representative feature of Southeastern Minnesota?
- How were the various rocks of B.V. State Park formed?
- Does the topography of Southeastern Minnesota affect its land use?
- Does land use affect water quality and the environment?
- What attracted the milling industry to Beaver Creek Valley?

Main Theme #2

Beaver Creek Valley State Park protects plants and animals in Minnesota that are more characteristically found in southern and eastern United States.

Sub-themes:

- What are some of the plants and animals that are found in BCVSP that are not found elsewhere in Minnesota?
- Can these plants and animals survive in Beaver Creek Valley State Park?
- Why is Beaver Creek Valley State Park mainly forested with little prairie area?
- The plant communities of the park have been affected by fire.
- Non-native plants degrade native ecosystems of the park.
- Can Beaver Creek Valley State Park be restored to the way it was when the first European settlers arrived?
- Can the timber rattlesnake survive in Beaver Creek Valley State Park?
- Exotic species removal is important for native species preservation.
- What are the effects of deer browse on native vegetation?

Main Theme #3

The East Beaver Creek Stream corridor and its associated communities are major resources that make the park attractive to visitors.

Sub-themes

- Who were the earliest people to live in Beaver Creek Valley?
- How was this land used by native Americans?
- What changes on the land were caused by the early European settlers?
- What effects have modern agricultural practices had on the Park?
- Why are different ecological communities found in the park?
- Clean, cold water is essential for a quality trout environment.
- Why is the aquatic eco-system of the trout stream corridor so unique and fragile?
- Where is the best place to observe wildlife in Beaver Creek Valley State Park?
- What affect does trout stream habitat have on the size of trout?
- Birding is big business in Beaver Creek Valley State Park.
- The stream corridor attracts wildlife photographers, and cross-country skiers during the winter months.
- How can the stream corridor sustain the different recreation uses and still maintain its resource integrity?

Programing

The themes presented here are examples of some, but not all of the program possibilities for Beaver Creek Valley State Park. Programing at the park will be developed using these themes, but additional themes may be developed for interpretive programs at the park in the future.

SUMMARY OF EXISTING INTERPRETIVE SERVICES

Staffing

The park has not had any full-time, seasonal, or volunteer naturalist in recent years. Naturalist led programs have not been budgeted nor a regular part of the park's operation during recent years. The park manager has led some programs for elementary school and scout groups upon request. These are very limited and require advance notice to fit into a very busy schedule of park operations. Beaver Creek Valley State park has become a host for the annual "Environmental Education Day" program held in the fall for the Houston County sixth grade elementary students. This is a special, one day event with many presenters from the DNR, Houston County, and other governmental agencies. Naturalist led programs for week end campers and day visitors are impossible and non existent due to staffing limitations on busy week-ends.

Trails, Exhibits, and Publications

Trails

A self-guided interpretive trail project proposal has been submitted but not yet funded for Beaver Creek Valley State Park.

Exhibits

A collection of interesting information, resources and mounted displays is found in the park office building. Included are such things as stuffed animals and birds, birds nests, fossils, bones, snake skins, feathers, posters, a library of reference books, and VCR tapes. These exhibits are not professionally done, many are not labeled or interpreted, and have no connecting theme. They are simply an interesting collection of things found in the park.

Publications

- Wildflower and fern list of Beaver Creek Valley State Park.
- Birds of Beaver Creek Valley State Park - a 1993 copy of the Houston County biological survey of birds found in the park.
- Various DNR publications of interest in the park library.

Signs

- Flash flooding in the park.
- Timber rattlesnake.
- Wild parsnip.
- Lyme disease.

Facilities

The "nature center" is located in the park office building which is the former managers residence. Space is limited, and many of the exhibits must be moved and stacked when

the nature center is used as a meeting room. The hours that the nature center is open are limited to when the park office is staffed by park personnel. Hours are very limited, especially on weekdays and during the offseason.

Area Interpretive Opportunities

Very few interpretive opportunities are currently provided except for Schech's Mill tours located just north of the park; Naturalist led programs at Forestville - Mystery Cave State Park; and Whitewater State Park, and Niagara Cave tours located near Harmony, MN. The Root River State Trail also offers some interpretation.



Typical interpretive sign used in state park system, proposed for Big Spring display.

INTERPRETIVE SERVICES RECOMMENDATIONS

There is a considerable unmet demand for naturalist led programs as well as non-personnel interpretation at Beaver Creek Valley State Park. During the planning process, it was suggested that a five month (May thru September) seasonal naturalist position should be given serious consideration for Beaver Creek Valley State Park. However, just as this plan was completed, the Division of Parks and Recreation decide to establish a new combined position to do interpretation and resource management in the "Blufflands" State Parks. This new position would be an "Area" position shared by Beaver Creek Valley, Carley, Great River Bluffs, John Latsch, and Whitewater State Parks.

The person in this position will carry out resource management activities such as conducting prescribed burns, old field restoration, exotic species management, monitor and evaluate management activities, identify and coordinate research activities with local colleges, and prepare detailed management plans. Interpretive responsibilities will include increasing nonpersonal interpretation such as self-guided trails, brochures, developing interpretive center displays, and interpretive signing. Also, the person in this position will conduct occasional interpretive programs in the parks.

Interpretive Services

Action: Provide funding for, and hire a combined position to do interpretation and resource management in the "Blufflands" State Parks.

Action: Provide funding for and develop a self-guided interpretive trail.

Action: Upgrade the existing exhibits in the "nature center" by labeling, interpreting and providing a connecting theme.

Action: Develop and print new brochures for BCVSP including a bird list, a wildflower list, and an anglers brochure with tips on fishing for trout in East Beaver Creek.

Action: Develop an interpretive publication about the park's resource management activities.

Action: Develop an interpretive publication on the geology of the park (drift less area, glacial meltwater, springs, etc).

Action: Develop interpretive signage at unique park features such as the "Big Spring".

VIII. FACILITIES AND BUILDING MANAGEMENT

ADMINISTRATIVE FACILITIES

ADA Requirements

The Department of Natural Resources follows the American Disabilities Act of 1992 to make public facilities accessible. All DNR development follows the guidelines as described in the "American with Disabilities Act Accessibility Guidelines For Buildings And Facilities". In addition, recreational development also follows the recommendations and guidelines proposed in "Recreational Facilities and Outdoor Development Areas". These guidelines were developed to address those outdoor facilities that are not adequately covered in the buildings and Facilities guidelines. The recommendations for recreational facilities were developed in 1994, but haven't been approved yet. The proposed guidelines are being followed as they are now. As any changes or revisions are made, they will be incorporated.

Action: All new and rehabilitated facilities will be brought up to ADA standards.

PROPOSED DEVELOPMENT

Administrative Service Area

The service and storage area is located just east of the park office. The location is in a poor spot, but there really isn't any alternative site at the present time. When the park is busy and traffic backs up near the office, the road to the shop becomes blocked.

Congestion just gets worse when service vehicles try to get into the shop area. Since it is unlikely that another service area will be found soon, circulation could be improved by adding an additional service entrance off the County Road 1, away from the office.

Equipment and material storage is the other problem that exists in the shop area. A short term option would be to get rid of some of the materials being stored near the shop building that are no longer serviceable. A medium term option would be to find a location outside the park for storage of seasonal equipment and materials. The garage attached to the park office is too small, and the stacks of materials presently being stored outdoors are not very aesthetic near the main entrance to the park. The long term solution would be to move the entire shop area away from the park entrance to some other location.

Shop Building Addition

The storage space in shop building is not large enough to store the various DNR equipment that should be indoors. The building is used DNR Forestry, MCC, and STS tools and equipment as well as the park's tools and equipment. Many items are stored outside, and are subject to the elements because of lack of room in the shop building.

Action: Add a large unheated storage addition to the existing shop building.

Service Area Loop Spur

Access to the shop building and service area consists of a single entrance road which is often blocked by campers parked outside the office waiting to register. This prevents rapid emergency response by park staff when they can't get out of the service area. In addition, it is difficult to get large vehicles into the service area when the road is blocked by campers.

Action: Provide a second entrance to the shop/service area by constructing a small road loop to the park entrance road on the east end of the service area.

Park Office

The existing office building was originally a split entry house that has been converted to serve as the park office. Although there is plenty of space is available, it was designed to serve as a residence and not as an office. The functional space used for customer service and administration work is very limited, which contributes to a less than desirable level of public service.

Action: Determine the feasibility of eliminating this building, and replacing it with a more appropriate, functional building.

Action: Re-evaluate the floor plan arrangement to see how it could be improved to better utilize the space that is available to better serve the public and the administrative work of the park.

Action: Remodel the park office interior to make it more functional.

Visitor Information

Since the park office is not always open, and there is not always park staff to answer visitors questions, a good visitor information signing system is very important. The park does not have sufficient signing at the office, primitive group camp, the picnic area or the north-end parking lot to properly serve park users. Important information such as park rules, emergency procedures, etc. is lacking or is not properly displayed.

Action: Add an information kiosk in front of the office to provide park visitors with camping information and information on things to do in the park when the office is closed.

Action: Install information signs or kiosks in the campground, primitive group camp, picnic area, and north-end parking lot.

Nature Center Interpretive Displays

The interpretive displays found in the nature center at the park office are very minimal, and not of professional quality. The displays include a collection of various items found in the park but with no connecting theme, and many of the items are not identified or labeled.

Action: Develop professional quality interpretive displays with a connecting park theme.

Park Office

The park office building was originally designed and used as a residence for the park manager rather than as an office. Inadequate space exists for both the park staff working in the small space behind the counter as well as for park visitors waiting for service. In addition, there is no private office for the park manager.

Action: Remodel the interior office space so it functions better as an office, and as a visitor contact station.

The aesthetics of the park office entrance area could be substantially improved by landscaping the area with native plants. Currently most of the area is mowed grass with wood chips in some of the high traffic areas.

Action: Landscaping the grounds around the office and service area with low maintenance native plants.

IX. PARK BOUNDARY

BOUNDARY MODIFICATION

State park boundaries are established by the Minnesota Legislature. Statutory boundaries serve to identify lands which can eventually be included in the park and acquired by the Division of Parks and Recreation. The Division of Parks and Recreation can only acquire land from willing sellers. Landowners are not required to sell to the state for park purposes. Inclusion in a park boundary does not limit what private land owners do with their property beyond what is authorized under local zoning ordinances.

Boundary modifications are considered during all state park management planning processes. Although this plan can recommend boundary changes, only the Minnesota Legislature can change park boundaries. All boundaries are legally described in Minnesota Statutes. When an addition to a park is considered, the DNR Division of Parks and Recreation will contact private landowners that would be within a proposed boundary and ask for their documented support. Appropriate local units of government will also be contacted for their support.

Action: No boundary modifications are proposed as a result of this planning process. Boundary modifications will be made on a case by case basis.

EXISTING STATUTORY BOUNDARY

The statutory boundary of Beaver Creek State Park contains 1187 acres. Of the statutory acres, 693.43 acres have been acquired by the state. The remaining 493.57 acres are privately owned in 14 parcels.

The existing Statutory boundary was established in 1969. Several private property owners within the statutory boundary have stated they first found out they were in the boundary of the park in 1979 when the first plan for Beaver Creek Valley was completed. The statutory boundary was a major issue in 1979. An alternative proposal was worked out, but was never implemented by the DNR.

During the present planning process two major issues surfaced concerning the illustration of the park statutory boundary on park maps. 1) people may use the private property as if it were owned by the state. 2) private land owners feel the state should not be planning how to use land it does not own. Although the DNR frequently states that being in the statutory boundary has no impact on how private land owners use their land, the landowners feel that is not true.

Action: Park maps will no longer include private lands. Only state owned lands will be illustrated on maps for public distribution.

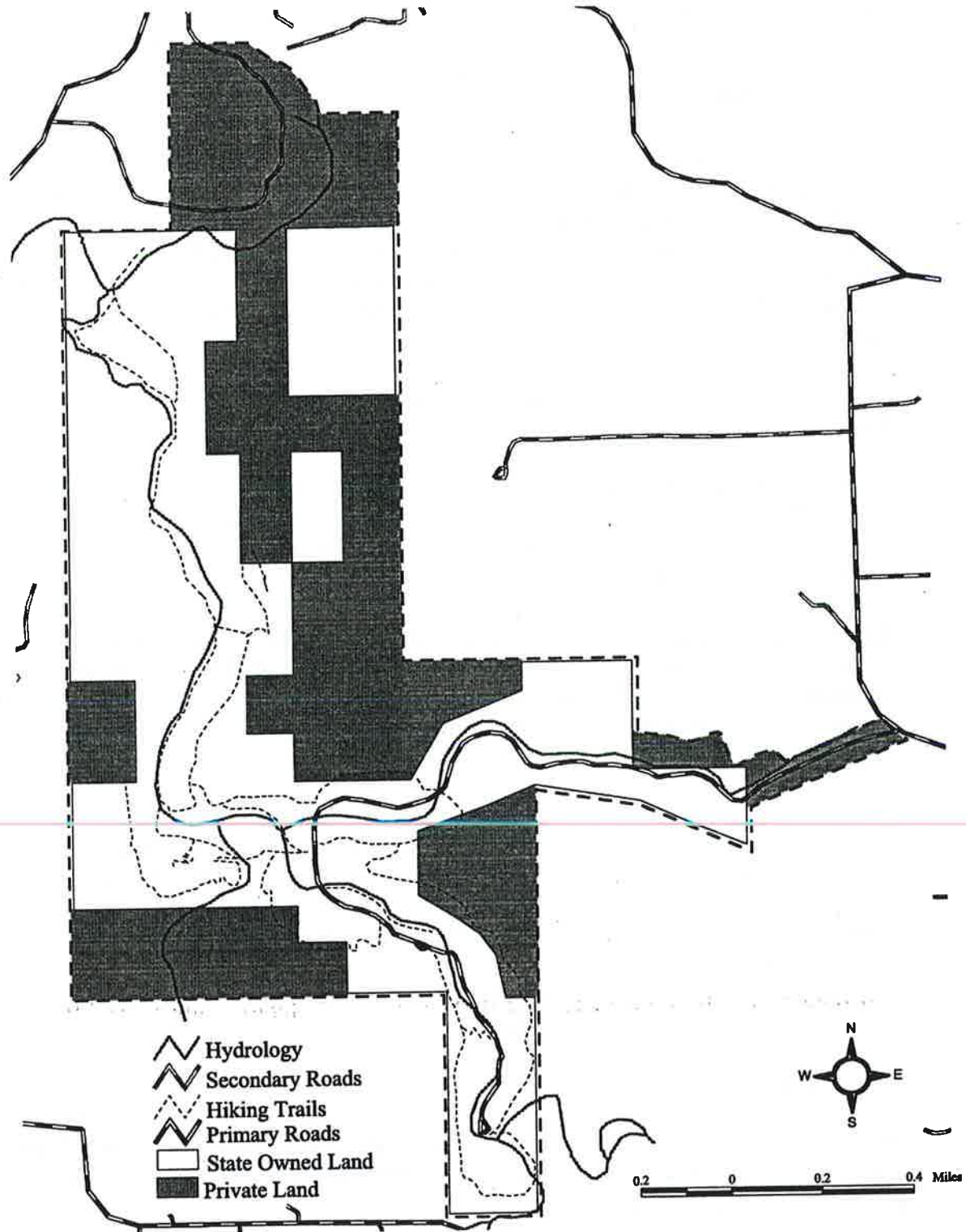
Survey and Post Park Boundaries

Survey data is incomplete for approximately 2/3 of the state owned park boundaries. Without this information it is very difficult to install state park boundary signs. Many areas of the park lack boundary signs, making enforcement of park rules very difficult particularly during hunting season.

Action: Complete survey for the remainder of state-owned lands.

Action: Install state park boundary signs in all areas where they are missing.

Beaver Creek Valley State Park Land Ownership



X. OPERATIONS, STAFFING, AND COSTS

OPERATIONS AND STAFFING

Visitation at Beaver Creek Valley State Park is significant during the spring and fall "shoulder" seasons, before Memorial day week-end and after Labor day week-end. Traditional peak or busiest periods in most Minnesota State Parks occur during the summer camping period from Memorial Day week-end through Labor Day week-end. The reasons for Beaver Creek State Park's busy "shoulder" seasons are several. Stream trout fishing, and spring wild turkey hunting seasons which normally begin during the middle of April, are the major

reasons for a busier than normal spring season. In addition bird-watching, wildflower viewing, and school groups are significant contributing factors in the spring. Stream trout fishing through the end of September, fall wild turkey hunting seasons, and fall leave colors, account for a busier than normal fall season.

Note: Busier than normal spring and fall shoulder seasons are typical for southern Minnesota State Parks' due to extended warm weather seasons.

In addition, there are a significant number of requests for park interpretive programs that are currently not being met. This is especially true for late April and May. This is a very demanding time for park staff with seasonal startup, mandatory training requirements, resource management projects, and early influx of park visitors. With no park Naturalist or interpretive staffing at BCVSP the park manager can meet only a small portion of the request for interpretive programs. This is unfortunate because BCVSP is very rich in resources, and provides a rather exceptional outdoor classroom setting for school age children.



Park office is always busy on weekends and holidays.



On-going campsite maintenance work.

With the proposed eastward expansion of the Root River State Trail, there is local interest in a bicycle trail linkage between the communities of Caledonia and Houston. Included here is the possibility of linking BCVSP to this bicycle trail network. If BCVSP were to link up with the Root River State Trail, visitation by both bicyclist and hikers would increase not only during the busy summer season, but also during the spring and fall shoulder seasons. The need for additional staffing hours will undoubtedly result if this occurs.

As facilities are added to the park, and increases in use occur, adjustments in staffing levels should also occur. New facilities should reflect the most critical needs in the park. Budgets are expected to continue to be fairly tight for the foreseeable future, so new park facilities should be carefully designed to minimize staffing costs.

COSTS

Operational Costs

If all of the actions and recommendations in this park plan were to be implemented, the park's annual operational costs would increase significantly. The level of this increase is difficult to estimate due to the general nature of many of the recommendations in this plan. However, the increase in staffing needs outlined in the previous section combined with the development projects outlined below, suggest that the park's annual operating budget could be increase by 40% to 50%.

Development Costs

The following list represents those actions that have developed costs associated with them. The total cost to implement these actions as listed is estimated at \$ 400,000 (In 1998 dollars). This estimate was generated as part of the planning process and has a significant margin of error because a variety of assumptions were made realized to unknown variables.



Any additional facilities will require additional operational costs.

- Rehabilitate campground water system.
- Rehabilitate picnic ground sanitation building or replace with vaults.
- Install two new vault toilets in group camp.
- Evaluate the need to pave campground road, or establish an annual maintenance budget.
- Rehabilitate trail system.
- Two small shelters in picnic area.
- One small shelter in group camp.
- Self-guided interpretive trail.
- Interpretive displays for nature center.
- Rehabilitate picnic shelter building.
- Level campsite spurs.
- Culvert/steel grates on campground road.
- Restore north-end parking lot.
- Replace low-water crossing at campground entrance.
- Gravel roads and parking lots.
- Landscape park entrance.
- Complete boundary survey - post boundaries.
- Camper cabin(s).
- Service area loop spur.

XI. PARTNERSHIPS WITH THE COMMUNITY

PARTNERSHIP OBJECTIVES

Volunteers provide a valuable service to the park which can result in long term benefits to the park and its resources. Many extra projects can be completed that could not be done park staff alone. Most volunteer projects will be approved on a first come, first serve basis. Volunteers and park staff need to be flexible. Occasionally the park manager may have to turn down a partnership or volunteer proposal due to limited time, conflict with dates, funding, conflict with union contracts, or inappropriateness of the proposal.

Volunteer application forms are available at the park office and must be completed prior to commencing with a project to ensure that volunteers are covered by Workman's Compensation while working in the park. Special work permits may be issued to volunteers for their vehicles if needed.

When project volunteers arrive in the park for a project, park staff explain the project and give the necessary guidelines on how to complete the project. Volunteers need to keep track of and record the number of hours they have worked each day. Status of the project should be reviewed periodically by volunteers and park staff. The park staff help volunteers to become more self-sufficient once they become regular participants. There may be times when the park will need to send volunteers to special training or provide other special assistance.

The DNR Volunteer Program has a well established set of rewards in the form of hats, mugs, pins, plaques, etc. There are presented to volunteers as they earn them or at a special volunteer recognition event.

Partnerships with local units of government, volunteer groups and individuals, local schools, chambers of commerce, and tourism organizations are an outgoing and important aspect of working with the community. Existing partnership projects include the following:

- Work with Beaver Creek Valley State Park Citizens Advisory Committee to solicit input and discussion for completion of this unit management plan.
- Work with the Beaver Creek Valley State Park Ecosystem Based Management Team (DNR) to solicit input and discussion for completion of this unit management plan.
- Work with the Beaver Creek Valley State Park Citizens Advisory Committee to solicit the formation and development of a "Friends" support group for the park.
- Work with the Citizens for Southeastern Minnesota State Parks to provide input and discussion of Region 5 State Park issues.
- Work with and maintain membership in the Minnesota Parks & Trails Council to provide input and discussion on statewide state park issues such as trail development and land acquisition.

- Work with and maintain membership in the Southeastern Minnesota Historic Bluff Country Tourism organization to promote Beaver Creek Valley State Park.
- Work with and maintain membership in the Caledonia Chamber of Commerce on issues such as trail expansions which affect Beaver Creek Valley State Park.
- Work with Houston County Elementary School teachers to conduct the annual "Environmental Education Day" program at Beaver Creek Valley State Park for all the sixth grade elementary students in Houston County.
- Work with the Blufflands Landscape team to promote preservation of our beautiful blufflands in Southeastern Minnesota.
- Work with Houston County Sentence-to-Serve crew leaders and crew members to accomplish projects in the park such as trail pruning, brush removal, etc.
- Work with Division of Forestry Minnesota Conservation Corps crew leaders and crew members to accomplish projects in the park such as controlled prairie burns, picnic table repairs/painting, trail pruning, tree removal, brush removal, etc.
- Work with Minnesota Ornithologists Union, Minnesota Native Plant Society, area Audubon Society Chapters, Minnesota Herpetology Society, Minnesota Extension Service, and other conservation organizations.
- Work with the Root River Soil and Water Conservation Agency, the Houston County Water Planning Agency, etc., to promote good soil and water conservation practices in the watershed that affects Beaver Creek Valley State Park.
- Work with scout troops and other volunteers performing worth while projects in the park such as litter pick-up, trail maintenance, etc.
- The park manager will meet with the Beaver Creek Valley State Park Citizens Advisory Committee or with a "Friends group" if one is formed, on a semi-annual basis, or more often if necessary to provide a progress report on the actions outlined in this management plan. Accomplishments, problem areas, etc. will be reported to the committee by the park manager. This will insure continued involvement by the committee until all objectives and actions set forth in this plan have been met.

TOURISM

Private facilities should be promoted to help meet visitor needs for a variety of recreational activities.

Action: The park staff will recommend private facilities such as mill tours, cave tours, and privately owned campgrounds, especially when the park campground is full. Park staff will cooperate with and complement private facilities in the area.

Action: Plan for increased use because Beaver Creek Valley State Park has experienced very significant growth in visitation and revenue collected since the mid 1990's.

Action: Seek opportunities to promote educational use of plan resources by teachers and school children. Beaver Creek Valley State Park is an exceptional outdoor classroom for nature study.

Action: Cooperate with area Chambers of Commerce and other tourism groups to promote the entire area of southeastern bluff country.

VOLUNTEERS

The unit plan and annual work plans will set directions for volunteer projects.

Action: Develop a volunteer plan and process for maximum utilization of volunteers in the park.

Action: A list of volunteer projects will be made available so that volunteers can select projects that are appropriate for their skills, knowledge, and abilities.

Groups of volunteers may also add new volunteer ideas to this project list. If a project is appropriate, and funding and staff time are available, the park manager will of the project. If a volunteer project is not appropriate, the park manager will work with the volunteer(s) to modify the project, if possible.

Action: The park will attempt to utilize volunteers and partnerships as much as possible.

PARTNERSHIPS

Encourage partnerships with park neighbors, area landowners, conservation groups, and others to promote ecosystem based management on private property for habitat and watershed protection.

Action: Work with landowners within the park boundary and in adjacent areas so that land is managed to protect water quality, woodlands, and other natural resources.

Action: Park staff should participate in local and regional planning efforts to sustain healthy ecosystems. Planning should begin at the landscape level to determine where opportunities exist in the landscape to promote natural community efforts.

Action: Park staff should work with groups active in water related issues such as watershed planning, etc.

XII. PLAN MODIFICATION PROCESS

State Park Management Plans document a partnership-based planning process, and the recommended actions resulting from that process. These comprehensive plans recognize that all aspects of park management are interrelated, and that management recommendations should also be interrelated.

Overtime, however, conditions change that affect some of the plan recommendations (or, in extreme cases, an entire plan). Plans need to acknowledge changing conditions, and be flexible enough to allow for modifications as needed.

For the purpose of this plan, we will differentiate between less controversial plan revisions, and major plan amendments. Minor plan revisions can generally be made within the Division of Parks and Recreation. If a proposed change to a management plan meets any of the criteria below, it must follow the Plan Amendment Process. To maintain consistency among the plans and processes, all revisions and amendments should be coordinated through the Division of Parks and Recreation planning section. Requests for planning assistance should be directed to the Division of Parks and Recreation Planning Manager at the central office.

MAJOR PLAN AMENDMENTS

CRITERIA FOR MAJOR PLAN AMENDMENTS

If a proposed change meets any of the following criteria, it must be approved through the management process below.

The proposed change:

1. Alters the park mission, vision, goals, or specific management objectives outlined in the plan;
2. Is controversial among elected officials and boards, park user groups, the public, adjacent landowners, other DNR divisions or state agencies; or
3. Directly affects other state agencies (e.g. Minnesota Historical Society).

MANAGEMENT PLAN AMENDMENT PROCESS

1. Division of Parks and Recreation Initial Step: Review plan amendment at the park and regional level. Determine which stakeholders potentially have a major concern and how those concerns should be addressed. If the major concerns are within the Division of Parks and Recreation, the issue should be resolved within the division. Review the proposed approach with central office managers.
2. If the proposed change issue involves different DNR Divisions, the issue should be resolved by staff and approved by the Division Directors. This may require one or two area/regional integrated resource management team meetings. The Division Directors will determine whether the

proposed change should go through the departmental review process (C-Tech/Senior Manager).

3. If the proposed change issue involves other state agencies, the issue should be resolved by staff and approved by the appropriate Division Directors.
4. If the proposed change is potentially controversial among elected boards, park user groups, adjacent landowners or the public, the park advisory committee should discuss the proposed change, and attend an open house forum that is advertised in the local and regional area. Following the open house, the Division of Parks and Recreation Director will determine whether the proposed change should be reviewed by the department.
5. All plan amendments should be coordinated, documented, and distributed by the Division of Parks and Recreation planning staff.

PLAN REVISIONS

If a plan change is recommended that does not meet the amendment criteria above, and generally follows the intent of the park management plan (through mission, vision, goals, and objectives), the Division of Parks and Recreation has the discretion to modify the plan without a major planning process.

REVISIONS RELATED TO PHYSICAL DEVELOPMENT CONSTRAINTS AND RESOURCE PROTECTION

Detailed engineering and design work may not allow the development to be completed exactly as it is outlined in the plan. A relatively minor modification, such as moving a proposed building site to accommodate various physical concerns, is not uncommon. Plans should outline a general direction and document the general "areas" for development rather than specific locations. For the most part, plans are conceptual, not detail-oriented. Prior to development, proposed development sites are examined for the presence of protected Minnesota Natural Heritage Program elements and historical/archaeological artifacts. If any are found, the planned project may have to be revised to accommodate the protection of these resources.

PROGRAM REVISIONS

The resource management section and interpretive services section of the plan should be updated periodically as needed. The Division of Parks and Recreation's Resource Management and Interpretive staff will determine when an update is needed, and coordinate the revision with the park planning section. Program sections should be rewritten in a format consistent with the plan as originally approved by the DNR. To retain consistency, park planning staff should be involved in chapter revision review, editing, and distribution.

APPENDIX A - BIBLIOGRAPHY

Albert, D.A. 1993. Draft ecoregion map and classification of Michigan, Minnesota, and Wisconsin.

Checklist for the birds of Beaver Creek Valley State Park. MN DNR, Division of Parks and Recreation. May, 1994.

Dept. of Revenue, REMI model.

Harris, J.M. 1951 Minnesota Conservation Volunteer. July-August.

Kratz, T.K., and G.L. Jensen. 1983. Minnesota's Landscape Regions. *Natural Areas Journal* 3(2): 33-44.

Lommen, G. And Steffen, H. 1953 Minnesota Conservation Volunteer, May-June.

Marschner, F.J. 1974. The Original Vegetation of Minnesota, a map compiled in 1930 by F.J. Marshner from U.S. General Land Office Survey Notes and published in 1974 under the direction of M.L. Heinselman of the U. S. Forest Service. Cartography Laboratory of the Department of Geography, University of Minnesota, St. Paul. 1 map (1:500,000).

Memos from David Meineke, Mineral Exploration Supervisor, Division of Minerals, DNR, Jan. 27, 1976. - (Revised by Dennis Martin, Division of Minerals, May, 1997).

Meyer, R.W. 1991 Everyone's Country Estate, Minnesota Historical Society Press.

Minnesota Geological Survey. St. Paul, Minnesota. 632 pp.

Minnesota Department of Natural Resources. 1995. *Interpretive Services Plan*.

Minnesota Department of Natural Resources. 1996. Minnesota State Parks.

Minnesota Department of Natural Resources, Natural Heritage and Nongame Research Program. 1997. *Known locations of rare features within the current and proposed boundaries of Beaver Creek Valley State Park, including a 2-mile radius around both boundaries.* Natural Heritage Database.

Minnesota State Historic Preservation Office. 1995. Annual Report Adapted for southern Minnesota.

Minnesota Department of Natural Resources, Trails and Waterways Unit. 1996. *Minnesota Registry of Public Trail Mileages*.

Minnesota Department of Natural Resources. 1979. *A Management Plan for Beaver Creek Valley State Park*.

Minnesota Office of Tourism and Minnesota Alliance of Campground Operators. 1996. *1996 Campgrounds and RV Parks*.

Minnesota Department of Natural Resources, Division of Parks and Recreation. May, 1994. *Checklist for the birds of Beaver Creek Valley State Park*.

Minnesota Office of Tourism.

Minnesota Historical Society. 1976. List of historical and archaeological sites submitted by Field Services, Historic Sites Archaeology Division.

US Department of Commerce. August, 1991. *1990 Census of Population and Housing, Minnesota*.

US Department of Agriculture December, 1978..*Soils Survey of Blue Earth County, MN*.

Wheeler, G.A., R.P. Dana, and C. Converse. 1992. Contribution to the vascular (and moss) flora of the Great Plains: a floristic survey of six counties in western Minnesota. *The Michigan Botanist* 30(3): 75-129.

Wheeler, G.A., E.J. Cushing, W. Gorham, T. Morley, and G.B. Ownbey. In press. A major floristic boundary in Minnesota: an analysis of 280 taxa occurring in the western and southern portions of the state. *Canad. J. Bot.*

Wright, H. E., Jr. 1972. Physiography of Minnesota. In *Geology of Minnesota*. P.K. Sims and G.B. Morey (eds.).

APPENDIX B - SOIL DESCRIPTIONS

Arenzville silt loam (16): LCC: IIw

Nearly level, moderately well drained. Located in valleys along streams that drain into the Root and Mississippi Rivers. Subject to occasional flooding early in the spring. Tends to puddle. Trees grow well on this soil if competing vegetation is removed. Not suitable for building sites or septic fields due to flooding problems. Roads may be constructed on raised, well compacted fill material with ditches and culverts to protect from flooding and frost.

Becker sandy loam (25): LCC: IIs

Nearly level, well drained. Located mainly on flood plain of Root River. Subject to rare flooding. Well suited to trees. Not suitable for building sites or septic fields due to flooding problems. Roads may be constructed on raised, well compacted fill material with ditches and culverts to protect from flooding and frost.

Seaton silt loam (103B): LCC: IIe

3-6% slopes. Well drained, gently sloping on crest of ridges. Easily eroded. Tends to puddle. Suited for trees. Suitable for building development and septic fields. Roads need to be constructed on coarse and well compacted base material.

Seaton silt loam (103C2): LCC: IIIe

6-12% slope. Well drained, sloping soil on ridgetops. Easily eroded. Tends to puddle. Suited for trees. Competing vegetation should be controlled. Buildings should be designed to conform to natural slope of land. Land shaping needed in some areas. Roads need to be constructed on coarse and well compacted base material. Land shaping and distribution lines across slope needed for septic fields.

Seaton silt loam (103D2): LCC: I'VE

12-20% slope. Well drained, moderately steep, sloping soil on ridgetops. Easily eroded. Tends to puddle. Suited for trees. Extension land shaping needed due to slope. Buildings should be designed to conform to natural slope of land.. Roads need to be constructed on coarse and well compacted base material. Roads should be constructed on contour and road banks should be planted. Land shaping and distribution lines across slope needed for septic fields.

Kennebec silt loam (250): LCC: IIw

Occasionally flooded. Moderately well drained, along stream valleys. Well suited to black walnut, white ash, sugar maple. Not suitable for building sites or septic fields. Construct roads on raised, coarse fill with ditches and culverts due to flooding and low soil strength.

Seaton silt loam (388C2): LCC: IIIe

6-12% slope, valleys. Well drained, on foot slopes. Easily eroded. Tends to puddle. Suited for trees. Land shaping needed due to slope. Buildings should be designed to conform to natural slope of land.. Roads need to be constructed on coarse and well compacted base material. Land shaping and distribution lines across slope needed for septic fields.

Seaton silt loam (388E): LCC: VIe

20-30% slope, valleys. Steep, well drained on upper part of foot slopes below steep to very steep sides of ridges along stream valleys. Easily eroded. Well suited to trees (native hardwoods such as northern red oak) with only slope limitation. Slope limits building. Needs land shaping. Buildings should be designed to conform to land slopes. Roads need to be constructed on coarse

and well compacted base material. Should also be constructed on contour and need to plant road banks. Land shaping and distribution lines across slope needed for septic fields.

LaCrescent cobbly silty clay loam (457G): LCC: VIIe

45-70% slope. Well drained, very steep on sides of ridges along stream valleys. Fair suitability for woodland but has low AWC, rapid runoff, and shallow rooting depth. Roads should be built on contours if at all. Difficult to build and expensive due to slope. Erosion and runoff problems. Some areas are excellent for recreation. Trails that can be developed in some areas offer scenic settings. Generally not suitable for building, roads or septic fields.

Root silt loam (471): LCC: Vw

Poorly to very poorly drained, nearly level along narrow valleys. 1-3 feet above channel of flowing creeks. Frequent and brief flooding. High water table. Cobbles on surface. Not suitable for building or septic fields. Does not filter effluent. Roads should be built on raised, well compacted, coarse fill with ditches and culverts.

Brodale cobbly fine sandy loam (488G): LCC: VIIs

45-70% slope, rocky. Excessively drained, very steep on sides of ridges along stream valleys. Outcroppings of rock common on nose positions and near top of slopes. 10-50% covered with cobbles. Poorly suited to woodland due to slope, low AWC, and warm exposures. Unique because it supports some of the last native prairie grasses in this part of the country. Not suitable for building, roads, septic fields.

Blackhammer-Southridge silt loams (580C2): LCC: IIIe

6-12% slopes, eroded. Well drained, sloping on ridgetops. Tends to puddle. Easily eroded. Well suited to trees. Buildings should be designed to conform to natural slopes. Land shaping may be necessary. Shrink swell may damage foundations etc. Roads should be constructed on contour and road banks planted. Use well compacted coarse base material to reduce clay problems. Not good for septic fields due to slope and low permeability. Can however construct larger than normal field and use distribution lines.

Blackhammer-Southridge silt loams (580D2): LCC: I'VE

12-20% slopes, eroded. Well drained, moderately steep to steep, sloping on ridgetops. Tends to puddle. Easily eroded. Well suited to woodlands. Buildings should be designed to conform to natural slopes. Extensive land shaping necessary. Shrink swell may damage foundations etc. Roads should be constructed on contour and road banks planted. Use well compacted coarse base material to reduce clay problems. Poorly suited for septic fields due to slope and low permeability.

Lamoille-Dorerton silt loams (584F): LCC: VIIe

30-45% slopes. Well, drained, very steep on sides of ridges along stream valleys. Outcrops of sandstone and limestone in some areas. Fairly suited to woodland, especially native hardwoods. Rapid runoff. Easily eroded. Roads should be built on contour but are difficult and costly to build. Some areas are excellent for recreation with scenic trails. Not suitable for building, roads, septic fields.

Nodine-Rollingstone silt loams (586C2): LCC: IIIe

4-12% slopes, eroded. Well drained, gentle sloping on crests. Tends to puddle. Easily eroded. Well suited to trees, native hardwoods. Buildings should be designed to conform to natural slopes. Shrink swell problems. Large stones may hamper construction. Roads should be placed on contour and road banks planted. Use well compacted, coarse base material due to shrink

swell. Effluent does not absorb due to slope and permeability so restricted for septic fields. Can install larger than usual field and place distribution lines across slope.

Nodine-Rollingstone silt loams (586D2): LCC: I'VE

12-20% slopes, eroded. Well drained, moderately steep and narrow ridgetops. Tends to puddle. Easily eroded. Well suited to trees, native hardwoods. Extensive land shaping needed. Buildings should be designed to Poorly suited for roads due to low strength and slope. Need large amounts of cutting and filling and well compacted coarse material. Construct roads on contour and plant road banks. Effluent does not absorb due to slope and permeability so poorly suited for septic fields.

Lamoille-Elbaville silt loams (592E): LCC: VIe

20-30% slopes. Well drained, upper sides of ridges. Erodeable. Fairly suited for trees. Rapid runoff. Compact clay subsoil. Roads should be built on contour. Extensive land shaping needed. Building should conform to natural slope. Poorly suited for roads due to low strength and slope. Large amounts of cutting and filling needed. Use compacted coarse material. Plant road banks. Poorly suited to septic fields.

Elbaville silt loam (593F): LCC: VIIe

30-45% slopes. Well drained, very steep on foot slopes. Well suited to woodland. Erodeable. Gullies develop easily. Not suitable for building sites, roads, septic fields.

Beavercreek Arenzville Complex (598B): LCC: VIs

1-12% slopes. Nearly level, moderately well drained on alluvial fans and upper reaches of narrow valleys. Occasionally flooded. Parts are poorly suited to trees, other parts are suited to oaks and black walnut. Cobbly surface in some areas. Not suitable for building or septic fields due to flooding. Roads may be constructed on compacted fill with ditches and culverts.

Huntsville- Beavercreek silt loams (604): LCC: Vw

Channeled. Well drained, nearly level to sloping on upper reaches of valley. Occasional flooding. Meandering stream channel. Not suitable for building, septic fields due to flooding. May construct roads on raised coarse fill with ditches and culverts due to low strength and flooding.

Terril loam (1812): LCC: I

Sandy substratum. Moderately well drained, nearly level to gently sloping on slightly elevated positions along Root River. Subject to rare flooding. Not generally suited to woodland but well suited to trees. Not suitable for building due to flooding. May construct roads on raised coarse fill with ditches and culverts due to floods and low strength. Suitable for septic fields.

Beavercreek variant silt loam (1893C): LCC: IIIe

3-8% slopes. Well drained, gently sloping to sloping on small fans and narrow flood plains. Occasional flooding. Trees are well suited to soil. Not suitable for building or septic fields due to flooding. May construct roads on raised coarse fill with ditches and culverts.

Source: *Soil Survey of Houston County, Minnesota.* US Department of Agriculture, Soil Conservation Service. February 1984.

Equal opportunity to participate in and benefit from programs of the Minnesota Department of Natural Resources is available to all individuals regardless of race, color, national origin, sex, age or disability. Discrimination inquiries should be sent to MN-DNR, 500 Lafayette Road, St. Paul, MN 55155-4031 or the Equal Opportunity Office, Department of the Interior, Washington, D.C. 20240.